



**Upgrade Fire Alarm System**

Boston, MA - P&DC

USPS Project No. B19159

A/E Project No. 13038.00

prepared by

**McKinnell McKinnell & Taylor Inc.**

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March 8, 2017

000002

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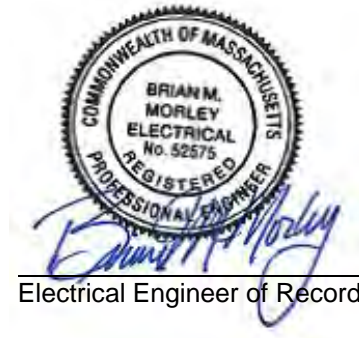
SEALS PAGE

PROJECT

Name: Upgrade Fire Alarm System  
Location: Boston, MA – P&DC  
FMS Project Number: B19159

ELECTRICAL ENGINEER OF RECORD

McKinnell McKinnell & Taylor, Inc  
164 Washington Street  
Norwell, MA 02061



3/8/17  
Date

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USPS SPECIFICATION

Date: 51/2014

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NOT USED

END OF SECTION

USPS Mail Processing Facility Specification issued: 5/1/2014  
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SECTION 011000  
SUMMARY OF WORK

PART 1 - GENERAL

1.1 SCOPE

- A. The Contractor must provide all material, labor, tools, plant, supplies, equipment, transportation, superintendence, temporary construction of every nature, and all other services and facilities necessary to complete the installation of a new fire alarm system for the Postal Service, including all incidental work described in the contract documents.
- B. The scope of work is attached to the Contract.
- C. Scope of work includes but is not limited to, the following:
  - 1. Provide new addressable fire detection and alarm system including control panels, power supplies, initiation devices, notification appliances, relays, components, and accessories.
  - 2. Removal of existing multiplex fire detection and alarm system, in a phased manner within respective areas upon installation, testing, and acceptance of new fire alarm system.
  - 3. Removal and reinstallation of existing acoustic ceiling tiles to facilitate wiring of new fire alarm system and removal of existing fire alarm
- D. All work shall be in accordance with applicable codes and local regulations that may apply. In case of conflict in or between the Contract Documents and a governing code or ordinance, the more stringent standard shall apply.

1.2 POSTAL SERVICE FURNISHED – CONTRACTOR INSTALLED EQUIPMENT

NOT USED

1.3 MISCELLANEOUS CONTRACT EXPENSES

NOT USED

1.4 USPS DIRECT VENDOR EQUIPMENT OR SUPPLIES

NOT USED

1.5 USPS PRE-APPROVED VENDOR EQUIPMENT OR SUPPLIES

NOT USED

1.6 MISCELLANEOUS EQUIPMENT CROSS-REFERENCE LIST

NOT USED

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PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

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Date: 5/1/2014

SUMMARY OF WORK

## SECTION 011104

## CONTRACT DOCUMENTS

## PART 1 – GENERAL

## 1.1 SUMMARY

- A. The contract documents consist of the items included, or attached and incorporated by reference, in Section B, The Contract, B. 1500, *Attachments*.

## 1.2 Drawing List

- A. The contract drawings consist of the items included, or attached and incorporated by reference, in Section B, The Contract, B. 1500, *Attachments*.

B.	Drawing number	Date	Title
	T1.01	3/8/17	TITLE SHEET
	E0.01	3/8/17	FIRE ALARM LEGEND AND NOTES
	E0.02	3/8/17	FIRE ALARM DETAILS
	ED1.01	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - BASEMENT - GARAGE
	ED1.02	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - BASEMENT - A
	ED1.03	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - BASEMENT - B
	ED1.04	3/8/17	FIRE ALARM REMOVAL PLAN SPA - BASEMENT - C/D
	ED1.05	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 1ST FLOOR - A
	ED1.06	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 1ST FLOOR - B
	ED1.07	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 1ST FLOOR - C
	ED1.08	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 1ST FLOOR - D
	ED1.09	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 1ST FLOOR WEST MEZZANINE - A / B
	ED1.10	3/8/17	FIRE ALARM REMOVAL PLANS SPAA & SPA 1ST FLOOR MEZZANINE A/B & C/D
	ED1.11	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 2ND FLOOR - A
	ED1.12	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 2ND FLOOR - B
	ED1.13	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 2ND FLOOR - C
	ED1.14	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 2ND FLOOR - D
	ED1.15	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 2ND FLOOR EAST MEZZANINE - A / B
	ED1.16	3/8/17	FIRE ALARM REMOVAL PLAN SPAA - 3RD FLOOR - B
	ED1.17	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 3RD FLOOR - C
	ED1.18	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 3RD FLOOR - D
	ED1.19	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 4TH FLOOR - C
	ED1.20	3/8/17	FIRE ALARM REMOVAL PLAN SPA - 4TH FLOOR - D
	ED1.21	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - ROOF - A
	ED1.22	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - ROOF - B
	ED1.23	3/8/17	FIRE ALARM NEW WORK PLAN SPA - ROOF - C
	ED1.24	3/8/17	FIRE ALARM NEW WORK PLAN SPA - ROOF - D



E1.01	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - BASEMENT - GARAGE
E1.02	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - BASEMENT - A
E1.03	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - BASEMENT - B
E1.04	3/8/17	FIRE ALARM NEW WORK PLAN SPA - BASEMENT - C/D
E1.05	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 1ST FLOOR - A
E1.06	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 1ST FLOOR - B
E1.07	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 1ST FLOOR - C
E1.08	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 1ST FLOOR - D
E1.09	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 1ST FLOOR WEST MEZZANINE - A / B
E1.10	3/8/17	FIRE ALARM NEW WORK PLANS SPAA & SPA 1ST FLOOR MEZZANINE A/B & C/D
E1.11	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 2ND FLOOR - A
E1.12	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 2ND FLOOR - B
E1.13	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 2ND FLOOR - C
E1.14	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 2ND FLOOR - D
E1.15	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 2ND FLOOR EAST MEZZANINE - A / B
E1.16	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - 3RD FLOOR - B
E1.17	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 3RD FLOOR - C
E1.18	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 3RD FLOOR - D
E1.19	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 4TH FLOOR - C
E1.20	3/8/17	FIRE ALARM NEW WORK PLAN SPA - 4TH FLOOR - D
E1.21	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - ROOF - A
E1.22	3/8/17	FIRE ALARM NEW WORK PLAN SPAA - ROOF - B
E1.23	3/8/17	FIRE ALARM NEW WORK PLAN SPA - ROOF - C
E1.24	3/8/17	FIRE ALARM NEW WORK PLAN SPA - ROOF - D
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E3.01	3/8/17	STAIR SECTIONS SPAA
E3.02	3/8/17	STAIR SECTIONS SPA
E4.01	3/8/17	FIRE ALARM RISER
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END OF SECTION

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## SECTION 013200

## CONSTRUCTION PROGRESS DOCUMENTATION

## 1.1 Scheduling Work

- A. Before any of the work is started, the Contractor must confer with the COR and agree on a sequence of procedures: means of access to premises and building; delivery of materials and use of approaches; use of corridors, stairways, elevators, and similar means of communication; and the location of partitions, eating spaces for Contractor's employees, and the like.
- B. No work can be done during the holiday mailing season between November 15 and January 5 without written permission from the COR.

## 1.2 Construction Progress Chart

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Construction Progress Chart*, prepare and submit a progress chart within five (5) days after receipt of the Notice to Proceed to show the principal categories of work corresponding with those used in the Schedule of Values:
  - 1. The order in which the Contractor proposes to carry on the work.
  - 2. The date on which it will start each category of work.
  - 3. The contemplated dates for completion.
- B. The chart must be in suitable scale to indicate graphically the total percentage of work scheduled to be in place at any time. At intervals as directed by the COR the Contractor must:
  - 1. Adjust the chart to reflect any changes in the contract work.
  - 2. Enter on the chart the total percentage of work actually in place.
  - 3. Submit six (6) copies of the chart to the Contracting Officer or their designated representative.

1.3 Contractor-Prepared Network Analysis System - Include Contractor-Prepared Network Analysis System only if listed in Block 9 of Page 1 – *Offer and Award*. Modify as required for specific project scope.

NOT USED

## 1.4 Progress Meetings

- A. The contractor shall attend progress meetings at weekly intervals. Dates of meetings will be coordinated with preparation of payment requests.
  - 1. Attendees: In addition to representatives of Owner and Architect, the Contractor's project manager and superintendent, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities with Project and authorized to conclude matters relating to the work.
  - 2. Agenda: Be prepared to discuss the following:
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
    - b. Review phasing procedures to ensure impact to owner is minimized.

- c. Review present and future needs of each entity present, including the following:
  - 1) Interface requirements.
  - 2) Sequence of operations.
  - 3) Status of submittals.
  - 4) Deliveries.
  - 5) Off-site fabrication.
  - 6) Access.
  - 7) Site utilization.
  - 8) Temporary facilities and controls.
  - 9) Work hours.
  - 10) Hazards and risks.
  - 11) Progress cleaning.
  - 12) Quality and work standards
  - 13) Changes orders.
  - 14) Documentation of information for payment requests.
- 3. Minutes: The Architect will record the minutes and distribute them to the owner and the Contractor. The Contractor shall distribute the Architect's minutes to affected subcontractors and suppliers.
- 4. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule prior to following meeting.

END OF SECTION

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## SECTION 013300

## SUBMITTAL PROCEDURES

## 1.1 Schedule of Submittals

A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning Shop Drawings, Coordination Drawings, *Record "As Built" Drawings*, and *Schedules*; within 30 days after receiving a Notice to Proceed, the Contractor must complete the Schedule of Submittals, in the format indicated below, in duplicate, listing all items that must be furnished for review and approval by the Postal Service. The schedule must indicate the type of items (such as sample, shop drawings, catalog cut, and so forth) and include the scheduled dates of submittal. In preparing the schedule, adequate time (10 business days or more, exclusive of time in the mails) must be allowed for review and approval and possible resubmittal. Also, the schedule must be coordinated with the approved construction progress chart. The Contractor must revise and/or update the schedule as directed. Such revised schedules must be made available to the COR for monitoring.

B. Within 30 days after receiving a Notice to Proceed, the Contractor must complete and submit to the COR a listing of all subcontractors, including subcontractor name, address, telephone number, fax number and email address. Include an updated list with each progress payment request.

## C. Schedule of Submittals Format

Project \_\_\_\_\_

Contract No. \_\_\_\_\_

Project Description \_\_\_\_\_

Spec. Section	Spec. Description	Paragraph Number	*Submittal Type	Date		Action Taken	Assigned Number
				Submittal	Returned		

\*Submittal Type:

C – Certificate

S – Sample

SD – Shop Drawing

CD – Catalog Data

PL – Spare Parts List

MM – Maintenance Manual

## 1.2 Shop Drawings and Related Data

A. Submittal of shop drawings, samples and related data must conform to the requirements of the terms and conditions of the contract provisions and clauses, including those concerning *Record "As Built" Drawings*, and *Samples*. Prior to submittal, the Contractor must stamp the submittal to indicate that it has been reviewed and approved. The Contractor must make any corrections required by the COR. If the Contractor considers any correction indicated on the drawings to constitute a change to the contract drawings or specifications, notice, as required under the terms and conditions of the contract provisions and clauses, including those concerning Changes must be given to the COR. Six (6) prints of all

approved shop drawings must be given to the COR. The approval of the drawings by the COR must not be construed as a complete check but indicates only that the general method of construction and detailing is satisfactory. Approval of the shop drawings does not relieve the Contractor of responsibility for any error that may exist because the Contractor is responsible for the dimensions and design of adequate connections and details and for satisfactory construction of all work. The submission by the Contractor must be accompanied by a transmittal letter of a type approved by the COR.

1. Each shop drawing must have a blank area of 5 by 5 inches, located adjacent to the title block. The title block must display:
  - a. Number and title of drawing;
  - b. Date of drawing or revision;
  - c. Name of project building or facility;
  - d. Name of Contractor and (if appropriate) of subcontractor submitting drawing;
  - e. Clear identity of contents and location on the work; and
  - f. Project title and contract number.
2. All drawings to be provided shall be clear and fully representative of the facility and fixed mechanization work.
3. Drawing files to be in .dwg and .pdf formats. .dwg files to be generated from Autocad revision 12 or other revision level concurred by USPS.
4. Documents other than drawings shall be provided in MicroSoft Word format.
5. Interim project documentation may be provide to USPS electronically
6. All final project documentation shall be provided to the USPS on a single CD or DVD media

### 1.3 Equipment Room Layout Drawings

NOT USED

### 1.4 Material, Equipment, and Fixture Lists

- A. When required by the technical provisions, lists of materials, equipment, and fixtures must be submitted by the Contractor in accordance with the requirements specified for shop drawings. The lists must be supported by sufficient descriptive material, such as catalogs, cuts, diagrams, and other data published by the manufacturer, as well as by evidence of compliance with safety and performance standards, to demonstrate conformance to the specification requirements. Catalog numbers alone are not acceptable. The data must include the name and address of the nearest service and maintenance organization that regularly stocks repair parts. No consideration will be given to partial lists submitted from time to time. Approval of materials and equipment is tentative, subject to submission of complete shop drawings indicating compliance with the contract documents.

### 1.5 Certificates of Compliance

- A. Any certificates required for demonstrating proof of compliance of materials with specification requirements, including mail certificates, statements of application, and extended guarantees, must be signed and submitted six (6) copies to the COR at least 10 days before delivery. The Contractor must review all certificates before submissions are made to the COR, to ensure compliance with the contract specification requirements and to ensure that the affidavit is properly signed. Each certificate must be signed by an official authorized to certify on behalf of the manufacturing company and must contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates must contain the name and address of the testing laboratory and the dates of tests to which the report applies. Certification must not be construed as relieving the Contractor from furnishing satisfactory material if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

## 1.6 A-E's Review of Submittals

- A. When submittals are reviewed by the A-E on behalf of the COR, each submittal must be returned to the Contractor stamped or marked by the A-E in one of the following ways:
  - 1. A Action: The Contractor is advised that "A Action" means that fabrication, manufacture, or construction may proceed, provided the work complies with the contract documents.
  - 2. B Action: The Contractor is advised that "B Action" means that fabrication, manufacture, or construction may proceed, provided the work complies with the A-E's notations and the contract documents.
  - 3. C Action: The Contractor is advised that "C Action" means that no work may be fabricated, manufactured, or constructed and that the Contractor must make a new submittal to the A-E. Any submission marked "C Action" is not permitted on the site.
- B. The A-E must return reproducibles stamped "A Action" or "B Action" to the Contractor, who is responsible for obtaining prints of them and for distributing them to the field and to subcontractors.
- C. In the case of shop drawings in the form of manufacturers' descriptive literature, catalog cuts, and brochures stamped "A Action" or "B Action," the A-E must return the stamped copies to the Contractor, who is responsible for distributing them to the field and to the subcontractors. If the shop drawings are stamped "C Action," the A-E will return stamped copies to the Contractor, who must submit new shop drawings to the A-E.
- D. In the case of samples stamped "A Action" or "B Action," the A-E must return one of the samples to the Contractor. In the case of samples stamped "C Action," the A-E must return all of the submitted samples.

## 1.7 Spare Parts Data

- A. Spare parts data must be submitted in quadruplicate in accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Spare Parts Data*.

## 1.8 Schedule of Values

- A. In accordance with the terms and conditions of the contract provisions and clauses concerning, *Construction Cost Breakdown*, the Contractor must submit a construction cost breakdown using the attached Schedule of Values. When applicable, a separate cost breakdown form must be submitted for each separate building. However, the total cost of site work for the facility must be included in the cost estimate breakdown for the main postal building. The number of items provided on the Systems Construction Cost Estimate Breakdown form are the minimum required. Additional subdivision of these items may be used by the Contractor.
- B. Submit the construction cost breakdown after contract award to the COR. A Sample Schedule of Values and Definitions is attached to this Section, as Attachment A.
- C. Do not delete items from the Schedule of Values form. However, expand the schedule "Description of Work" as necessary to allow evaluation of work or to make partial payments.
- D. If the contract price changes, the Schedule of Values must be revised to reflect the change(s) and forwarded to the COR.
- E. A current Schedule of Values must accompany all Contractor Requests for Payment.

1.9 Fixed Mechanization Construction Cost Estimate Breakdown Summary

NOT USED

END OF SECTION

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Date: 5/1/2014

SUBMITTAL PROCEDURES

## Schedule of Values

Facility: Boston, MA - P&amp;DC - Upgrade Fire Alarm System

FSM Project Number: B19159

Contractor:

Date:

Item	Description of Work	Material	Labor	Total
Division 01	<b>General Conditions</b>			
1.1	Overhead			\$ -
1.2	Profit			\$ -
1.3	Bldg. Permits			\$ -
1.4	Testing			\$ -
1.5	Other			\$ -
Division 02	<b>Existing Conditions</b>			
2.1	Demolition			\$ -
2.2	Asbestos and Lead Abatement			
Division 03	<b>Concrete</b>			
	Not used			\$ -
Division 04	<b>Masonry</b>			
	Not used			\$ -
Division 05	<b>Metals</b>			
	Not used			\$ -
Division 06	<b>Wood, Plastics and Composites</b>			
	Not used			\$ -
Division 07	<b>Thermal &amp; Moisture Protection</b>			
7.1	Firestopping			\$ -
7.2	Joint Sealants			\$ -
Division 08	<b>Openings</b>			
	Not used			\$ -
Division 09	<b>Finishes</b>			
	Not used			\$ -
Division 10	<b>Specialties</b>			
	Not used			\$ -
Division 11	<b>Equipment</b>			
	Not used			\$ -
Division 12	<b>Furnishings</b>			
	Not used			\$ -
Division 13	<b>Special Construction</b>			
	Not used			\$ -
Division 21	<b>Fire Suppression</b>			
	Not used			\$ -
Division 22	<b>Plumbing</b>			
	Not used			\$ -
Division 23	<b>Heating Ventilating and Air Conditioning</b>			
	Not used			\$ -
Division 25	<b>Integrated Automation</b>			
	Not used			\$ -
Division 26	<b>Electrical</b>			
26.1	Electrical Power			\$ -
Division 27	<b>Communications</b>			
	Not used			\$ -
Division 28	<b>Electronic Safety and Security</b>			
28.1	Fire Alarm Control Panels			
28.2	Fire Alarm Initiation Devices			
28.3	Fire Alarm Notification Appliances			
28.4	Fire Alarm Raceways & Wiring			
28.5	Fire Alarm Testing & Commissioning			
28.6	Fire Alarm Existing Fire Alarm Co. (Simplex/Grinnell)			\$ -
	Services Coordination and Decommissioning			
Division 31	<b>Earthwork</b>			
	Not used			\$ -
Division 32	<b>Exterior Improvements</b>			
	Not used			\$ -
	<b>Total</b>	\$ -	\$ -	\$ -

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## SECTION 013543

## ENVIRONMENTAL PROCEDURES

## PART 1 – GENERAL

## 1.1 SCOPE

- A. This section is required in accordance with the terms and conditions of the contract provisions and clauses, including those concerning Safety & Health Standards, Accident Prevention, Protection of the Environment, Existing Vegetation, Structures, Utilities and Improvements, and Handling Asbestos and other Hazardous Materials. The work covered by this section consists of furnishing all labor, material, and equipment and performing all work required for compliance with environmental regulations and preventing pollution during, and as a result of, construction operations under this contract, in addition to those measures set forth in other technical provisions of these specifications.
- B. The Contractor and subcontractors must comply with all applicable federal, state and local laws and regulations related to the environment, health and safety.

## 1.2 NOTIFICATION

- A. The Contractor must, after receiving a notice of noncompliance with the foregoing provisions, immediately take corrective action. The notice, when delivered to its Contractor or its authorized representative at the site of the work, is deemed sufficient for this purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost because of any such stop orders may be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is subsequently determined that the Contractor was in compliance and the Contractor demonstrates that it is otherwise entitled to an extension of time, excess costs or damages, under the applicable terms and conditions of the contract provisions and clauses.

## 1.3 ENVIRONMENTAL REGULATORY COMPLIANCE

- A. Within 30 days after receiving the notice to proceed or not less than 15 days prior to commencing on-site work, the Contractor must submit any environmental documents that are required by federal, state or local environmental regulations. Plans must be approved by the COR prior to commencing on-site work and must describe and include, but is not limited to, the following
  - 1. Waste Minimization and Management Plan must describe how natural resources potentially impacted by construction will be protected or managed; construction wastes will be stored and disposed of or recycled; and pollutants associated with building materials will be controlled. The waste minimization and management section of the plan must also list materials and construction debris to be recycled, and address the disposal of solid and hazardous wastes and materials, including asbestos and lead-based paint. It must also include tables applicable to the reclamation of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) in accordance with 1.4 (B) below.

#### 1.4 ENVIRONMENTAL SITE CONTROLS

- A. Location of Hazardous Materials: The location of the Contractor's temporary storage of any hazardous materials and/or wastes must be appropriately marked and included in the health and Safety Plan (see Section 1.5 below).
- B. Post-construction Cleanup or Obliteration: The Contractor must remove and properly dispose of all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, excess or waste materials, or any other vestiges of construction as directed by the COR. No separate or direct payment may be made for post-construction cleanup and all associated costs must be considered included in the contract price.
- C. Historical and Archeological: Monuments, markers, and works of art must be protected. Items discovered that have potential historical or archeological interest must be preserved. The Contractor must leave the archeological find undisturbed and must immediately report the find to the COR so that the proper authority may be notified.
- D. Dust Control: The Contractor must keep the site free from dust in accordance with applicable federal, state and/or local regulations.
- E. Noise Minimization: The Contractor must perform demolition and construction operations to minimize noise including conducting work during less sensitive hours of the day in accordance with applicable noise control regulations.

#### 1.5 HEALTH AND SAFETY

- A. Prior to commencing on-site work, the Contractor must submit an Occupational Safety and Health Administration (OSHA) Emergency Action Plan (EAP) to the Contracting Officer to demonstrate compliance by the Contractor and subcontractors with applicable OSHA regulations. If the Contractor is not required by OSHA to develop a written EAP, i.e. if 10 or fewer are employed for the construction project or any other specific regulations identified by OSHA, then the Contractor shall submit to the Contracting Officer a signed letter stating the Contractor shall meet OSHA's EAP requirements in a verbal communication to all employees.
- B. The Postal Service has provided a *Safety and Health Guide for Contractors*, as Attachment A to this section. Prior to commencing on-site work, Contractor must read the *Safety and Health Guide for Contractors* and must sign the attached Certificate of Understanding acknowledging and accepting the requirements stated therein.
- C. Prior to commencing on-site work, the Contractor must submit a project-specific Project Safety Plan to the Contracting Officer. The plan must include, but is not limited to, hazard communication, labeling, emergency response and preparedness and training.
- D. Copies of Material Safety Data Sheets (MSDSs) for any hazardous material(s), as defined by OSHA's Hazard Communications Standard, must be included whenever such materials arrive on-site. MSDSs must be kept together and maintained centrally on-site through to project completion. Provide a copy of each MSDS in the Operating and Maintenance Manual. The use of asbestos containing materials, in excess of one percent as defined by US Environmental Protection Agency regulations, is prohibited in the construction of this project. Provide an executed copy of the "Certificate of Asbestos and Lead-Based Paint (New Work)" in the Operating and Maintenance Manual and include a copy with the final payment request.

- E. The use of lead-based paint is prohibited in the construction of this project.
- F. The use of lead-containing solder for plumbing and plumbing fixtures is prohibited in the construction of this project.
- G. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Asbestos Free and Lead-Based Paint Free Certification*, the Contractor must sign and submit to the Contracting Officer the attached "Certification of Asbestos and Lead-Based Paint" for this project. The signed certificate is required to be included in the final payment request.
- H. Do not use any of the USPS targeted chemicals (see regulated and prohibited materials identified under Safety and Health and related environmental requirements).

## PART 2 - PRODUCTS

NOT USED

## PART 3 - EXECUTION

NOT USED

END OF SECTION

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## Safety and Health Guide for Contractors

### Certificate of Understanding

This *Safety and Health Guide for Contractors* was developed by the Postal Service to provide guidance for contractors hired to perform repair, alteration, renovation, demolition, equipment installation, and other work requiring access to postal-owned or -leased property.

### Distribution

A copy of this Certificate of Understanding should be signed by the Contractor's representative at the post award orientation conference or before the commencement of work. A copy of this guide should be readily accessible where the work is being performed. The contracting officer's representative (COR) should thoroughly brief the Contractor's representative on the Contract Safety and Health Requirements contained herein.

### Contractor's Verification Statement

As a representative of \_\_\_\_\_ (Contractor's name), I have received the *Safety and Health Guide for Contractors* prepared by the Postal Service. As the Contractor's representative, I understand and accept the requirements contained herein, and I have reviewed each of the required sections of the guide with the COR and/or the designated Postal Service representative. I agree to review the contents of this guide with all subcontractors hired to perform work on postal property.

### Contractor's Representative

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Designated Postal Service Representative

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Safety Representative (If Required by COR)

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Postal Service CO, COR, or Project Manager

Printed Name: \_\_\_\_\_ Contact Number: \_\_\_\_\_  
Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Maintain a copy of this signed form in the Postal Service and Contractor's project files.**

## Safety and Health and Related Environmental Requirements

The Contractor is required to meet all applicable OSHA, federal, state, and local safety, health, and related environmental requirements in addition to the US Postal Service requirement listed in this table.

Issue	Postal Requirements
<b>Asbestos</b>	<p><i>Review of Facility Asbestos Survey:</i> Before any building maintenance, equipment installation, renovation, alteration, demolition, or other project begins, determine whether ACBM will be disturbed.</p> <p><i>Proper Work Practices:</i> If ACBM is present, follow proper control procedures and work practices.</p> <p><i>Consultation With Facility Asbestos Coordinator:</i> Consult with the facility manager or his or her designee before the start of any work likely to disturb ACBM. Disturbance means activities that crumble or pulverize ACBM or presumed asbestos-containing material (PACM) or generate visible debris. Operations may include drilling, abrading, cutting a hole, pulling cable, and crawling through tunnels or attics and spaces above the ceiling where asbestos is actively disturbed or asbestos-containing debris is actively disturbed.</p> <p><i>Asbestos Work Authorization:</i> You must have an approved Form 8210, <i>Work Authorization - Asbestos</i>, before work begins within any building containing asbestos.</p>
<b>Barricades, Barriers, and Warnings</b>	Your barricades must meet the OSHA requirements. In addition, you assume control of your work area during your activities unless otherwise specified in writing by the contracting officer (CO) or contracting officer's representative (COR).
<b>Confined Spaces</b>	<p>Confined space work must meet the OSHA requirements. You must have a comprehensive confined space program that includes a written program, employee training, entry and testing equipment, and rescue capabilities.</p> <p>If you require access to confined space requiring a permit, then the trained, designated Postal Service representative must review and approve the project and permit. Entry into other confined spaces must be in accordance with OSHA regulations.</p>
<b>Electrical Work</b>	Lock or rope off work areas involving exposed energized equipment or have an attendant present to prevent accidental contact by unqualified people. Refer to the Barricade section of this guideline for additional information.
<b>Elevated Work and Fall Protection</b>	Follow strictly the applicable OSHA fall protection requirements.
<b>Excavation</b>	<p>All excavations 4 feet or more in depth must be properly shored or sloped and meet all OSHA requirements.</p> <p>Before any digging or drilling commences, inform the Postal Service COR and call Dig Safe or its local equivalent to determine whether any underground utilities are located in the work area. Submit documentation that these notifications have been performed. You must not begin digging or drilling until you have verified that underground utilities have been identified and are properly marked so that work may be accomplished in a safe manner.</p>
<b>Fire Protection</b>	<p>Do not block, remove, or otherwise prevent Postal Service fire extinguishers from being immediately accessible and usable.</p> <p>If a system must be impaired by a scheduled shutdown, notify the appropriate Postal Service representative and do not proceed without Postal Service authorization.</p>
<b>Hazard Communication</b>	<p>Inform the Postal Service before any chemicals are used. Before materials are brought on site, provide material safety data sheets (MSDSs) and an inventory of materials. For projects that are anticipated to use substantial quantities of hazardous materials, you may be required to provide a routing, storage, and waste disposal plan.</p> <p>Upon request, the Postal Service will make available to you MSDSs for hazardous materials the Postal Service uses in the Contractor work area.</p>
<b>Hazardous Materials</b>	<p>Follow all OSHA requirements regarding hazardous materials. Hazardous materials include, but are not limited to, flammable and combustible liquids, gasoline, diesel fuel, motor oil, lubricating oil, hydraulic oil, corrosive cleaners, and battery acid.</p> <p>Provide secondary containment for all containers of liquids that are over 5 gallons in capacity.</p> <p>Immediately report all hazardous material releases ("spills"), regardless of how small or where they occur, to the designated Postal Service representative. Releases include solids, liquids, and gases.</p>

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<b>Hot Work</b>	<p>Do not begin any hot work until a Postal Service qualified person has completed and signed a Postal Service Hot Work Permit. The permit will be valid for only a single work shift. You must display the permit at the work site.</p> <p>You are prohibited from performing hot work (a) when the Postal Service has not authorized it, (b) in locations in which fire protection systems have been impaired, (c) in the presence of explosive or flammable atmospheres, or (d) in locations where large quantities of flammable and combustible materials are unprotected.</p>
<b>Powered Industrial Trucks</b>	<p>Powered industrial trucks and other mobile equipment must follow all traffic rules of the postal facility. The maximum speed limit for in-plant powered vehicles is 5 miles per hour. Many work areas have posted speed limits that you must strictly follow. Perform refueling only in authorized locations following safe procedures.</p> <p>As a general rule, the Postal Service does not allow gas- or diesel-powered industrial equipment inside postal facilities. Coordinate exceptions to the rule through the servicing safety office.</p>
<b>Ladders</b>	<p>Strictly follow all OSHA requirements regarding ladders. Barricade the ladder use area to prevent contact with mobile equipment and employees.</p>
<b>Lead-Based Paint</b>	<p><i>Review of Facility Lead Survey:</i> Before any construction, alterations, and/or repair activities begin, determine whether LBP will be disturbed. If the painted surface has not been tested, you must have it tested before beginning any activities that could potentially disturb LBP.</p> <p><i>Proper Work Practices:</i> If LBP is present, follow proper control procedures and work practices.</p> <p><i>Consultation With Facility Manager:</i> Consult with the facility manager or his or her designee before the start of any work likely to disturb LBP. Examples of activities that may affect LBP include paint removal by scraping, sanding, power tools, or heat guns; alterations that include removing drywall, structural steel, or other building materials coated with LBP; welding, cutting, or other hot work on coated metal surfaces; abrasive blasting of mail boxes and other equipment; and moving or cleaning of abrasive blasting enclosures.</p>
<b>Lockout/Tagout</b>	<p>Provide a copy of your lockout/tagout procedures, which must meet or exceed the OSHA Lockout/Tagout standard. You will be given access to and must review the Postal Service lockout/tagout program.</p> <p>If you encounter a Postal Service lockout/tagout device that prevents the continuation of work, do not make any attempts to remove, tamper with, or bypass the devices. Contact a Postal Service Maintenance official and make arrangements to have the lockout device removed in accordance with Postal Service lockout removal policies.</p>
<b>Machinery and Equipment</b>	<p>Postal facilities use state-of-the-art mail handling machinery, some of which may operate automatically. Hazards may include, but are not limited to, moving parts and power transmission apparatus, pinch points, electrical contact, and hot surfaces.</p> <p>Do not use machine surfaces as work platforms.</p> <p>Contact the designated Postal Service representative concerning facility machinery.</p>
<b>Personal Protective Equipment</b>	<p>Before beginning work, evaluate the work area for hazards, determine whether contract employees will be required to use personal protective equipment (PPE) to protect themselves from these hazards, and document the hazard assessment.</p> <p>Wear the PPE required by the postal facility in which you are working, regardless of your perception of hazard potential.</p>
<b>Regulated And Prohibited Materials</b>	<p><i>Pesticides.</i> The Postal Service has restricted the use of pesticides. Obtain prior approval of the district environmental compliance coordinator for special cases that may require the use of pesticide treatments.</p> <p><i>Chemical Prohibition.</i> Adhere to the Postal Service Hazard Communication Program and chemical prohibition policies. Do not use on postal property any of the chemicals prohibited by EPA unless a Postal Service person authorizes its use (each of these chemicals must be authorized separately). The USPS Office of Sustainability can supply the list.</p> <p><i>Asbestos-Free Products.</i> Install no asbestos-containing products or materials in postal facilities.</p> <p><i>Lead.</i> Apply no lead-based paint in postal facilities.</p>
<b>Scaffolding</b>	<p>Follow strictly the applicable OSHA scaffolding requirements.</p> <p>Provide adequate barrier protection around the scaffolding to prevent hazards to postal workers.</p>
<b>Walking and Working Surfaces</b>	<p>If the project requires temporary modifications to the means of egress, inform the designated Postal Service representative before performing such actions, provide appropriate alternative means of egress, and communicate these to all employees.</p>

## Emergency Procedures

<b>Preparations for Emergency</b>	<p>Be prepared for emergency situations.</p> <p>Ensure that emergency telephone numbers are site specific, readily available, easily read, and communicated to all employees.</p> <p>Train and authorize employees to implement emergency procedures.</p>
<b>Medical Emergencies</b>	<p>Have procedures and medical supplies to provide emergency medical services for your own personnel.</p> <p>Determine how to contact emergency medical services before work begins, and have on-site capabilities to contact such services immediately.</p>
<b>Fires</b>	<p>See Fire Protection above.</p> <p>In the event of a fire, you must:</p> <ul style="list-style-type: none"> <li>- Immediately remove personnel from the area or building following Postal Service evacuation procedures.</li> <li>- Immediately contact the nearest postal employee and inform him or her of the fire. You may also activate an emergency alarm in the area. If no postal employees are on-site, immediately contact the local fire department.</li> </ul> <p>Personnel trained in the use and limitations of fire extinguishers may attempt to extinguish the fire if it is safe to do so.</p>
<b>Chemical Releases</b>	<p>See Hazardous Materials above.</p> <p>If the event of a hazardous material release, you must:</p> <ul style="list-style-type: none"> <li>- Immediately remove personnel from the area or building following Postal Service evacuation procedures.</li> <li>- Immediately contact the designated Postal Service representative and inform him or her of the release. You may also activate an emergency alarm in the area. If no postal employees are on-site, immediately contact the local fire department.</li> </ul> <p>Contractor personnel should not respond to the release unless specifically trained and protected to perform hazardous material response.</p>
<b>Power Outages</b>	<p>In the event of a power outage, you must:</p> <ul style="list-style-type: none"> <li>- Immediately stop work and assemble for a head count and possible facility egress.</li> <li>- Inform all contract employees that equipment may automatically restart when power resumes.</li> <li>- Immediately contact the designated Postal Service representative and inform him or her of the status of contract work and personnel head count. Relay at this time all hazards created due to the power outage.</li> </ul> <p>When power resumes evaluate the status of operations that were being performed relative to hazard potential. For example, the interruption of ventilation in confined spaces may generate atmospheric hazards.</p>
<b>Accident Investigation and Reporting</b>	<p>As soon as is practical after an accident, investigate and document an accident investigation. The documentation must describe the incident and identify the causes and the corrective actions that will prevent future incidents.</p> <p>Report all accidents, whether or not they result in injury. Give the written report to the Postal Service COR within 24 hours of the accident or incident.</p>

## Certificate of Asbestos and Lead-Based Paint (New Work)

To: Contracting Officer, United States Postal Service

Subject: Certification for new construction

Postal facility name: \_\_\_\_\_

Postal facility address: \_\_\_\_\_

**Certification for new construction:**

This Contractor/Owner hereby certifies that no asbestos-containing material in excess of 1 percent as defined by applicable US Environmental Protection Agency regulations, and no lead-based paint has been furnished or installed at the referenced project.

Contractor/Owner name: \_\_\_\_\_

Signature: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_ Date executed: \_\_\_\_\_

The penalty for making a false statement is prescribed by 18 USC 1001.



## SECTION 014000

## QUALITY REQUIREMENTS

## 1.1 Contractor Quality Control

- A. Contractor Quality Control: The Contractor is responsible for the overall quality of all its own work and the work performed by their subcontractors working under this contract. The quality of any part of the work installed must not be less than that required by the technical divisions of this specification. If the COR determines that the quality of work does not conform to the applicable specifications and drawings, the Contractor will be advised in writing of the areas of nonconformance, and within 7 days the Contractor must correct the deficiencies and advise the COR in writing of the corrective action taken.
- B. Noncompliance with Quality Control Requirements: Failure of the Contractor to comply with the above requirements may be cause for termination for default as defined in the terms and conditions of the contract provisions and clauses, including those concerning, *Termination for Convenience or Default*, of the general contract clauses.

## 1.2 Submittals

- A. Prior to the start of on-site work, the Contractor must submit to the Contracting Officer a Contractor Quality Control Plan that includes the following information:
  - 1. Quality Control Organization: In chart form, showing relationship of Quality Control organization to other elements of Contractor's organization.
  - 2. Names and qualifications of personnel in Quality Control organization, including Contractor Quality Control Representative, inspectors, Independent Testing and Inspection Laboratory, and Independent HVAC Test and Balance Agency.
  - 3. Procedures for reviewing coordination drawings, shop drawings, certificates, certifications, or other submittals.
  - 4. Testing and inspection schedule, keyed to Construction Schedule, indicating tests and inspections to be performed, names of persons responsible for inspection and testing for each segment of work including preparatory, initial, and follow-up.
  - 5. Proposed forms to be used including Contractor's Daily Report, Contractor Test and Inspection Report and Non-Compliance Check-Off List.

## 1.3 Quality Control Procedures

- A. Monitor quality control over Contractor staff, subcontractors, suppliers, manufacturers, products, services, site conditions, and workmanship.
- B. Comply fully with manufacturer's published instructions, including each step in sequence of installation.
- C. Should manufacturer's published instructions conflict with Contract Documents, request clarification from COR before proceeding.
- D. Comply with specified standards as a minimum quality for work, except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons who are thoroughly qualified and trained in their respective trade, to produce workmanship of specified quality.
- F. Perform tests required by governing authorities having jurisdiction and utilities having jurisdiction.

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## 1.4 Testing and Inspection Laboratory Services

NOT USED

## 1.5 Contractor Field Inspection and Testing

- A. Contractor: Test and Inspect work provided under this Contract to ensure work is in compliance with Contract requirements. Required tests and inspections are indicated in each individual Specification Section.
- B. Preparatory Inspection: Performed prior to beginning work and prior to beginning each segment of work and includes:
  - 1. Review of Contract requirements.
  - 2. Review of shop drawings and other submittal data after return and approval.
  - 3. Examination to assure materials and equipment conform to Contract requirements.
  - 4. Examination to assure required preliminary or preparatory work is complete.
- C. Initial Inspection: Performed when representative portion of each segment of work is completed and includes:
  - 1. Performance of required tests.
  - 2. Quality of workmanship.
  - 3. Review for omissions or dimensional errors.
  - 4. Examination of products used, connections and supports.
  - 5. Approval or rejection of inspected segment of work.
- D. Follow-Up Inspections: Performed daily, and more frequently as necessary, to assure non-complying work has been corrected.
- E. Testing and Inspection: Perform testing and inspection in accordance with requirements in individual Specification Sections.

## 1.6 Contractor's Daily Report

- A. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Performance and Superintendence of Work by Contractor*, the Contractor shall submit daily report to COR, for days that work was performed. Include the following information:
  - 1. Date, weather, minimum and maximum temperatures, rainfall, and other pertinent weather occurrences.
  - 2. Daily workforce of Contractor and subcontractors, by trades.
  - 3. Description of work started, ongoing work, and work completed by each subcontractor.
  - 4. Coordination implemented between various trades.
  - 5. Approval of substrates received from various trades.
  - 6. Nonconforming and unsatisfactory items to be corrected.
  - 7. Remarks, to include at a minimum, any potential delays, schedule changes, workplace incidents or other items of note. However, nothing reported herein shall relieve the Contractor of the separate responsibility under other terms and conditions of the Contract provisions and clauses to provide specific notice to the Contracting Officer,

1.7 Contractor's Test and Inspection Reports

- A. Prepare and submit, to COR, a written report of each test or inspection signed by Contractor Quality Control Representative performing inspection within 2 days following day inspection was made.
- B. Include the following on written reports of inspection:
  - 1. Cover sheet prominently identifying that inspection "CONFORMS" or "DOES NOT CONFORM" to Contract Documents.
  - 2. Date of inspection and date of report.
  - 3. Project name, location, solicitation number, and Contractor.
  - 4. Names and titles of individuals making inspection, if not Contractor's Project Field Superintendent.
  - 5. Description of Contract requirements for inspection by referencing Specification Section.
  - 6. Description of inspection made, interpretation of inspection results, and notification of significant conditions at time of inspection.
  - 7. Requirements for follow-up inspections.

1.8 Non-Compliance Check-Off List

- A. Maintain check-off list of work that does not comply with Contract Documents, stating specifically what is non-complying, date faulty work was originally discovered, and date work was corrected. No requirement to report deficiencies corrected same day it was discovered. Submit copy of Non-Compliance Check-Off List of non-complying work items to COR on a weekly basis.

1.9 Completion and Inspection of Work

- A. Prior to final acceptance by Contracting Officer, submit a certification signed by Contractor to Contracting Officer stating that all work has been inspected and all work, except as specifically noted, is complete and in compliance with Contract Documents.

END OF SECTION

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## SECTION 015000

## TEMPORARY FACILITIES AND CONTROLS

## 1.1 General

- A. The Contractor must provide all temporary facilities and services required to complete the work and to comply with OSHA and other applicable regulations.
- B. The Contractor must maintain temporary facilities in a proper, safe, operating and sanitary condition for the duration of this Contract. Upon completion of this Contract, all such temporary work and facilities shall be removed in their entirety and the premises will be restored to its prior condition.

## 1.2 Project Sign

NOT USED

## 1.3 Bulletin Board

- A. The Contractor must provide and maintain a bulletin board, accessible at all times, and must contain wage rates, equal opportunity notice, and other items required to be posted.
- B. The Contractor must maintain the bulletin board in good condition throughout the life of the project. The bulletin board will remain the property of the Contractor and upon completion of the project must be removed from the site and the premises will be restored to its prior condition.

## 1.4 Construction-Use Utilities

NOT USED

## 1.5 Temporary Electricity

- A. All temporary electrical work shall be performed under the direct supervision of a licensed electrician who will be present on the project at all times when such work is being performed
- B. Safety: The Contractor must provide and maintain lights and signs to prevent damage or injury and must illuminate all hazardous areas. Safety lights must be kept burning from dusk to dawn.
- C. Use of Permanent System: The Contractor must regulate any part of the permanent electrical system that is used for construction purposes in order to prevent interference with safety and with the orderly progress of the work. The Contractor must leave permanent electrical services in a condition as good as new.
- D. Equipment: In compliance with NEMA standards, the Contractor must provide an appropriate enclosure for the environment in which the equipment is used.
- E. Installation: The Contractor must provide all required facilities, including transformers, conductors, poles, conduits, raceways, fuses, switches, fixtures, and lamps, located so as to avoid interference with cranes and materials-handling equipment, storage areas, traffic areas, and work under other contracts. The Contractor must install all work to have a neat and orderly appearance and to make it structurally sound throughout. The Contractor must maintain it to give continuous service and to provide safe working conditions. The Contractor must modify the service as required by the progress of the job.

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- F. Removal: The Contractor must remove all temporary equipment and materials upon completion of construction, repair all damage caused by the installation, and the premises will be restored to its prior condition.

1.6 Temporary Heating and Ventilation

NOT USED

1.7 Temporary Water

NOT USED

1.8 Sanitary Provisions

- A. The Contractor may use the existing sanitary facilities if the Contracting Officer determines this is acceptable to USPS. At any time, the Contracting Officer may direct the Contractor to provide at the site temporary toilet and handwashing facilities. Portable chemical toilets of an approved type will be considered acceptable.

1.9 Approaches and Exits

NOT USED

1.10 Postal Service Field Office

- A. The Contractor will maintain on site a complete set of drawings and specifications any time work is being done. The Contracting Officer and his representatives must have free access to the complete set of drawings and specifications at all times.
- B. The Contractor will be provided with space in which the Contractor must establish a temporary job office. The Contractor will equip the job office with a plan rack and plan table. The office must contain a complete set of drawings and specifications at all times. The job office must be equipped with temporary telephone. The Contracting Officer and his representatives must have free access to the job office at all times.
- C. Contractor must be equipped with cell phone or pager.

- 1.11 Project Photos - Required on construction contracts that exceed \$10,000.00. The number of photographs, and their content, shall be appropriate to the Contract Scope of Work, with their intended purpose being to illustrate, generally, the work in place for which this payment application applies.

END OF SECTION

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TEMPORARY FACILITIES  
AND CONTROLS

## SECTION 016000

## PRODUCT REQUIREMENTS

## 1.1 Product Options and Substitutions

- A. Refer to the terms and conditions of the contract provisions and clauses, including those concerning *Optional Materials or Methods (Construction), Materials and Workmanship, Information On "Equal" Products and Brand Name or Equal*.
- B. Provide Products that comply with Contract Documents, which are undamaged and new at time of installation.
- C. Provide Products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.
- D. Substitutions may be considered when the Contractor:
  - 1. Becomes aware of a product or procedure that is more environmentally sensitive or is otherwise advantageous to the Postal Service;
  - 2. Represents that he has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
  - 3. Will provide the same guarantee for the substitution that he would for that specified; and
  - 4. Will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects, at no additional cost to the Postal Service and at no extension of the Contract completion date.

## 1.2 Product Delivery Requirements

- A. Transport and handle Products in accordance with manufacturer's instructions, using means and methods that will prevent damage, deterioration and loss, including theft.
- B. Schedule Product delivery to minimize long-term storage at Project site and prevent overcrowding of construction spaces.
- C. Coordinate Product delivery with installation schedule to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- D. Deliver Products to Project site in undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- E. Promptly inspect shipments to ensure that Products comply with project requirements, quantities are correct, Products are undamaged, and properly protected.
- F. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.3 Product Storage and Handling Requirements

- A. Store and protect Products in accordance with manufacturers' published instructions, with seals and labels intact and legible.
- B. Store Products subject to damage by elements above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's published instructions.
- C. Provide off-site storage and protection when Project site does not permit on-site storage or protection.
- D. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- E. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

END OF SECTION

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## SECTION 017300

## EXECUTION

## 1.1 Layout of Work

- A. The Contractor must lay out its work from Postal Service-established base lines and benchmarks indicated on the drawings and is responsible for all measurements based on them. The Contractor must furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor as may be required in laying out any part of the work from the base lines and benchmarks established by the Postal Service. The Contractor is responsible for the execution of the work to those lines and grades established or indicated by the COR.

## 1.2 Contractor's Temporary Use of Facilities and Equipment

- A. No new facilities or equipment intended for the permanent installation, including materials-handling vehicles, may be used for temporary purposes unless specified in the Contract or unless the Contractor has the written permission of the COR.

## 1.3 Cleaning

- A. Refer to the terms and conditions of the contract provisions and clauses, including those clauses *Debris and Clean Up*.
- B. Cleaning During Construction:
  1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
  2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
  3. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
  4. Collect and remove waste materials, debris, and rubbish from site as specified in the Environmental Compliance and Management Plan as required in Section 013543 - Environmental Procedures.
- C. Final Cleaning:
  1. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.
  2. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's published instructions.
  3. Complete following cleaning operations before requesting COR inspection for Substantial Completion.
    - a. Clean Project Site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter and foreign substances. Sweep paved areas broom clean. Remove petro-chemical spills, stains and other foreign deposits. Rake grounds that are neither planted nor paved, to a smooth even-textured surface.
    - b. Remove tools, construction equipment, machinery and surplus material from Project Site.
    - c. Remove snow and ice to provide safe access to building.



- d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
- e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
- f. Broom clean concrete floors in unoccupied spaces.
- g. Remove labels that are not permanent labels.
- h. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that can not be satisfactorily repaired or restored, or that show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical name plates.
- i. Wipe surfaces of mechanical and electrical equipment, and other similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
- 4. Remove temporary protection and facilities installed during construction to protect previously completed installations during remainder of construction.
- 5. Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from Project Site and dispose of in accordance with requirements of local authorities having jurisdiction.
- 6. Where extra materials of value remain after completion of construction, they become Postal Service property and these materials should be stored as directed by COR.

END OF SECTION

USPS Specification issued: 5/1/2014  
Last revised: 4/16/2013

## SECTION 017419

## CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes: Procedures for achieving the most environmentally conscious Work feasible within the limits of the Construction Schedule, Contract Sum, and available materials, equipment, and products.
  - 1. Participate in promoting efforts of Postal Service to create an energy-efficient and environmentally-sensitive structure.
  - 2. Use recycled-content, toxic-free, and environmentally-sensitive materials and equipment.
  - 3. Use environmentally-sensitive procedures.
    - a. Protect the environment, both on-site and off-site, during demolition and construction operations.
    - b. Prevent environmental pollution and damage.
    - c. Effect optimum control of solid wastes.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 013200 - Construction Progress Documentation.
  - 2. Section 014000 - Quality Requirements: Contractor's Daily Report.
  - 3. Section 015000 - Temporary Facilities And Controls: Temporary ventilation, progress cleaning and waste removal.
  - 4. Section 016000 - Product Requirements: Substitutions.
  - 5. Section 017704 - Closeout Procedures and Training: Record submittals.

## 1.2 DEFINITIONS

- A. Adequate ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of dust fumes, vapors, or gases.
- B. Construction and demolition waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair, and demolition operations.
  - 1. Rubbish: Includes both combustible and noncombustible wastes but excludes recyclable materials such as paper, boxes, glass, metal, lumber scrap and metal cans.
  - 2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings, stumps and rubble that result from construction or maintenance and repair work.
- C. Chemical waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
- D. Diversion: Redirection of waste ordinarily deposited in a municipal landfill to a recycling facility or to another destination for reuse.

- E. Environmental pollution and damage: The presence of chemical, physical, or biological elements or agents, which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.
- F. Hazardous materials: Includes pesticides, biocides, and carcinogens as listed by recognized authorities, such as the Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC).
- G. Interior final finishes: Materials and products that will be exposed at interior, occupied spaces; including flooring, wallcovering, finish carpentry, and ceilings.
- H. Municipal Solid Waste Landfill: A permitted facility that accepts solid, non-hazardous waste such as household, commercial, and industrial waste, including construction and demolition waste.
- I. Packaged dry products: Materials and products that are installed in dry form and are delivered to the site in manufacturer's packaging; including carpets, resilient flooring, ceiling tiles, and insulation.
- J. Sediment: Soil and other debris that has been eroded and transported by storm or well production runoff water.
- K. Sanitary wastes:
  - 1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food.
  - 2. Sewage: Domestic sanitary sewage.
- L. Wet products: Materials and products installed in wet form, including paints, sealants, adhesives, and special coatings.

### 1.3 SUBMITTALS

- A. Solid Waste Management and Environmental Protection Plan: Prepare and **submit at the Preconstruction Meeting** a Solid Waste Management and Environmental Protection Plan including, but not limited to, the following:
  - 1. Procedures for Recycling/Re-Use Program.
  - 2. Schedule for application of interior finishes.
  - 3. Revise and resubmit Solid Waste Management and Environmental Protection Plan as required by Postal Service.
    - a. Approval of the Contractor's Solid Waste Management and Environmental Protection Plan, will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures.
  - 4. Any permits required by local, state or federal agencies.
- B. With each Contractor's Report as specified in Section 014000 – Quality Requirements, submit an updated Summary Of Solid Waste Disposal And Diversion. Submit on form in Appendix A of this Section. Include manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material for:
  - 1. Municipal Solid Waste Landfills.
  - 2. Recycling/Reuse Facilities.
- C. With Record Submittals as specified in Section 017704 - Closeout Procedures and Training, submit the following:
  - 1. Final Summary Of Solid Waste Disposal And Diversion. Submit on form in Appendix A of this Section.
  - 2. Resource Conservation and Recovery Act Project Summary. Submit on form in Appendix B of this Section.

## PART 2 – PRODUCTS

NOT USED

## PART 3 – EXECUTION

## 3.1 RECYCLING AND REUSE

- A. Collection: Implement a recycling/reuse program that includes separate collection of waste materials of the following types as appropriate to authorized local and regional recycling/reuse facilities:
  - 1. Concrete.
  - 2. Metal.
    - a. Ferrous.
    - b. Non-ferrous.
  - 3. Debris.
  - 4. Paper/Cardboard.
  - 5. Plastic.
  - 6. Others as appropriate.
- B. Recycling/reuse centers: Contact state and/or local governmental solid waste offices, Environmental Protection Agency (EPA) regional offices, and authorized applicable non-profit organizations.
  - 1. Concrete.
  - 2. Metal.
  - 3. Wood.
  - 4. Debris.
  - 5. Paper/Cardboard.
  - 6. Plastic.
  - 7. Others as appropriate.
- C. Handling:
  - 1. Clean materials which are contaminated prior to placing in collection containers. Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
  - 2. Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- D. Participate in re-use programs: identify local and regional re-use programs, including but not limited to non-profit organizations such as schools, local housing agencies, and public arts programs, that accept used materials. The following are examples for Contractor's information only.
  - 1. National materials exchange network, such as CAL-MAX, a free service provided by various state and regional offices, designed to help businesses find markets for materials that traditionally would be discarded. The premise of the program is that material discarded by one business may be a resource for another business.
    - a. Items and regions covered by materials exchange programs may vary. Contact the applicable regional materials exchange program. In California, contact CAL-MAX at (916) 255-2369.
  - 2. Habitat For Humanity, a non-profit housing organization that rehabilitates and builds housing for low income families.
    - a. Sites requiring donated materials vary. Contact the national hotline (800) HABITAT.

- E. Rebates, tax credits, and other savings obtained for recycled or re-used materials accrue to Contractor.

### 3.2 ENVIRONMENTAL CONTROLS

- A. Protection of natural resources: Preserve the natural resources within the Project boundaries and outside the limits of permanent Work performed under this Contract in their existing condition or restore to an equivalent or improved condition as approved by Postal Service, upon completion of the Work.
1. Confine demolition and construction activities to work area limits indicated on the Drawings and as directed by COR.
    - a. Temporary construction: As specified in Section 015000 - Temporary Facilities And Controls.
    - b. Demolition and salvage operations: As specified in Section 024119 - Selective Structure Demolition.
    - c. Disposal operations for demolished and waste materials that are not identified to be salvaged, recycled or reused:
      - 1) Remove debris, rubbish, and other waste materials resulting from demolition and construction operations, from site.
      - 2) No burning permitted.
      - 3) Transport materials with appropriate vehicles and dispose off-site to areas which are approved for disposal by governing authorities having jurisdiction.
      - 4) Avoid spillage by covering and securing loads when hauling on or adjacent to public streets or highways. Remove spillage and sweep, wash, or otherwise clean project site, streets, or highways.
      - 5) Comply with applicable federal, state and/or local regulations.
  2. Water resources as follows:
    - a. Comply with requirements of the National Pollutant Discharge Elimination System (NPDES) and the State Pollutant Discharge Elimination System (SPDES).
    - b. Oily substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
      - 1) Store and service construction equipment at areas designated for collection of oil wastes.
    - c. Mosquito abatement: Prevent ponding of stagnant water conducive to mosquito breeding habitat.
    - d. Prevent run-off from site during demolition and construction operations.
  3. Land resources: Prior to construction, identify land resources to be preserved within the Work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from Postal Service.
  4. Air Resources: Prevent creation of dust, air pollution, and odors.
    - a. Use water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
      - 1) Do not use water when it may create hazardous or other adverse conditions such as flooding and pollution.
    - b. Do not use any hazardous chemicals on USPS property when it is a shared work space with USPS employees. If chemicals are authorized for use, store volatile liquids, including fuels and solvents, in closed containers.
    - c. Properly maintain equipment to reduce gaseous pollutant emissions.
    - d. Interior final finishes: Schedule construction operations involving wet products prior to packaged dry products to the greatest extent possible in accordance with Postal Service approved Solid Waste Management and Environmental Protection Plan.

5. Fish and Wildlife Resources: Manage and control construction activities to minimize interference with, disturbance of, and damage to fish and wildlife.
6. Noise Control: Perform demolition and construction operations to minimize noise. Perform noise producing work in less sensitive hours of the day or week as directed by Postal Service .
  - a. Repetitive, high level impact noise will be permitted only between the hours of 8:00 a.m. and 6:00 p.m. Do not exceed the following dB limitations:

<u>Sound Level in dB</u>
70
80

<u>Time Duration of Impact Noise</u>
More than 12 minutes in any hour
More than 3 minutes in any hour

- b. Provide equipment, sound-deadening devices, and take noise abatement measures that are necessary for compliance.

END OF SECTION

USPS Master Specifications, issued: 5/1/2014  
Last revised: 9/17/2013

## Appendix A

SUMMARY OF SOLID WASTE DISPOSAL AND DIVERSION

Project Name: \_\_\_\_\_ FMS Project Number: \_\_\_\_\_

Contractor Name: \_\_\_\_\_ License Number: \_\_\_\_\_

Contractor Address: \_\_\_\_\_

<b>Solid Waste Material</b>	<b>Date Material Disposed/ Diverted</b>	<b>Amount Disposed/ Diverted (ton or cu. yd)</b>	<b>Municipal Solid Waste Facility (name, address, &amp; phone number)</b>	<b>Recycling/Reuse Facility (name, address, &amp; phone number)</b>	<b>Comments (if disposed, state why not diverted)</b>
Asphalt					
Concrete					
Metal					
Wood					
Debris					
Glass					
Clay brick					
Paper/ Cardboard					
Plastic					
Gypsum					
Paint					
Carpet					
Other:					

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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CONSTRUCTION WASTE  
 MANAGEMENT AND DISPOSAL

## Appendix B

RESOURCE CONSERVATION AND RECOVERY ACT - PROJECT SUMMARY.

Project Name: \_\_\_\_\_ FMS Project Number: \_\_\_\_\_

Contractor Name: \_\_\_\_\_ License Number: \_\_\_\_\_

Contractor Address: \_\_\_\_\_

## 1.0 EPA GUIDELINE ITEMS

## A. Fly Ash:

1. Total dollar amount of concrete and cement provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of concrete and cement containing fly ash provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of concrete and cement containing fly ash provided for this project? \_\_\_\_\_.  
 a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.

## B. Building Insulation Products:

1. Total dollar amount of building insulation products provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of building insulation products containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of building insulation products containing recycled materials provided for this project? \_\_\_\_\_.  
 a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.

## C. Carpet:

1. Total dollar amount of carpet provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of carpet containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of carpet containing recycled materials provided for this project? \_\_\_\_\_.  
 a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.



## D. Floor Tiles (resilient):

1. Total dollar amount of floor tile (resilient) provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of floor tile (resilient) containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of floor tile (resilient) containing recycled materials provided for this project? \_\_\_\_\_.

a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.

## E. Floor Tiles (ceramic):

1. Total dollar amount of floor tile (ceramic) provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of floor tile (ceramic) containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of floor tile (ceramic) containing recycled materials provided for this project? \_\_\_\_\_.

a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.

## F. Hydraulic Mulch:

1. Total dollar amount of hydraulic mulch provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of hydraulic mulch containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of hydraulic mulch containing recycled materials provided for this project? \_\_\_\_\_.

a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.

## G. Compost:

1. Total dollar amount of compost provided for this project. \$\_\_\_\_\_.
2. Total dollar amount of compost containing recycled materials provided for this project. \$\_\_\_\_\_.
3. Were there any technical impediments to increasing the amount of hydraulic mulch containing recycled materials provided for this project? \_\_\_\_\_.

a. If yes, please explain. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_.

## 2.0 SPECIFICATIONS

NOT USED

3.0 SOLID WASTE PREVENTION

- A. Total dollar amount of solid waste disposed (landfill) for this project. \$\_\_\_\_\_.
- B. Total weight of solid waste disposed (landfill) for this project. \$\_\_\_\_\_.

4.0 RECYCLING

- A. Total dollar value of solid waste diverted from landfill and recycled or reused for this project. (Express as total dollar amount for solid waste disposal in landfill for equivalent type and amount of diverted waste.)  
\$\_\_\_\_\_.
- B. Total weight of solid waste diverted from landfill and recycled or reused for this project. (Express as total weight for solid waste disposal in landfill for equivalent type and amount of diverted waste.)  
Tons\_\_\_\_\_.

5.0 COMMENTS

- A. Comments and suggestions for increasing amount of recycled materials used in construction materials.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.
- B. Comments and suggestions for improving solid waste prevention and recycling efforts during construction.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## SECTION 017704

## CLOSEOUT PROCEDURES AND TRAINING

## PART 1 – GENERAL

## 1.1 MANUALS

- A. Purpose: Operation and maintenance manuals are for the training of, and use by, Postal Service employees in the operation and maintenance of the systems and related equipment as specified below. The manuals must consist of instruction on systems and equipment. A separate manual or chapter must be prepared for each of the following classes of equipment or system:
  - 1. Fire alarm system.
- B. Content: Unless otherwise indicated, each chapter must contain the following, as applicable:
  - Introduction.
  - Table of contents.
  - Description of system (including design intent and considerations).
- C. Preparation: The outline below is intended as a general guide for preparing the manuals. The manuals must be prepared to provide for the optimum operation and maintenance of the various systems. The description of systems and general operating instructions for plumbing and electrical manuals may cover only complicated or unusual parts of these systems, such as sewage ejectors, transformers, high tension switchgear, and signal and alarm systems. Manufacturer's literature and data must be those of the actual equipment installed under contract for the particular facility. Further guidance is available in the ASHRAE Handbook, 1984, Systems Volume, Chapter 39, Mechanical Maintenance.
- D. Suggested Outline for Operation and Maintenance (O&M) Manuals: This is a suggested outline, with general requirements of O&M manuals. The outline is presented to indicate the extent of material to be covered and the individual items required in manuals for Mail Processing Facilities. The outline may be modified to suit specific installations; however, the purpose of the manual must be fulfilled. The manual is not intended to duplicate manufacturers' data, but proper references must be made in the text of the O&M manual to indicate that that information is applicable and where it is located.
  - 1. Part I. Description and Design Intent
    - a. Introduction
      - 1) Provide a brief description of project and purpose of the maintenance manual. The following statements must be included: "Operation and maintenance of this equipment must be performed in accordance with this manual and posted instructions, subject to compliance with applicable technical guides and standards issued by USPS. It is recognized that minor changes in control points and settings will be required, based on actual operating experience, to correct varying conditions and improve operation. When such changes appear necessary, they must be submitted to the maintenance manager for consideration. Upon approval of any changes, the applicable portions of all copies of the manual and proposed instructions must be revised and reissued, and any change in operating procedure brought to the attention of all operating personnel."
      - 2) "This manual is specifically developed to assist the Postal official in charge at the facility to operate and maintain the building systems and equipment. Manufacturers' recommendations set forth for certain components must be followed during the complete warranty period for that equipment."

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- 3) Contents of Manual. This portion of the introduction must explain that the manual is to contain complete operating, maintenance, and safety instructions for all equipment listed. It must also contain any other appropriate references as required to outline an explanation of the manuals and major categories of reference material required with the manuals.
- b. Table of Contents
  - 1) The table of contents must list numbers and titles of chapters, sections, and main paragraphs, with their page numbers. Each volume in a set of manuals must contain its own table of contents. Publications containing 10 or more illustrations or tables must include a list of illustrations or tables, as applicable. These lists must show number, title, and page number of each illustration and table. Following is a typical table of contents:
    - a. Electrical Systems
      - 1.) Fire alarm
2. Part II. Operating Sequence and Procedures
  - a. Contents: Each chapter must describe the procedures necessary for Postal Service personnel to operate the system and equipment covered in that chapter.
  - b. Operating Procedures: The operating procedures must be divided into four subsections: Startup, Operation, Emergency Operation, and Shutdown.
    - 1) Startup: Give complete instructions for energizing the equipment and making initial settings and adjustments whenever applicable. If equipment is fully automatic, a statement to that effect is all that is required. If a specific sequence of steps must be performed, give step-by-step instructions in the proper sequence. If timing- (such as warm-up between power-on and adjustment) is important, clearly state the specific minimum time required at the proper point in the procedure. Refer to controls and indicators by panel; make references consistent with the nomenclature used in illustrations and tables of controls and indicators. If preliminary settings differ for different modes of operations, give procedures for each mode.
    - 2) Operation: Give detailed instructions in proper sequence for each mode of operation. When, for a given action on the part of the operator, alternate equipment responses are possible, give the appropriate operation reaction to each.
    - 3) Emergency Operation: If some functions of the equipment can be operated while other functions are disabled, give instructions for operations under these conditions. Include here only those alternate methods of operation (from normal) that the operator can follow when there is a partial failure or malfunctioning of components, or other unusual condition.
    - 4) Shutdown: Include instructions for stopping and securing the equipment after operation. If a particular sequence is required, give step-by-step instructions in that order.
3. Part III. Maintenance Instructions and Requirements
  - a. Contents: Each chapter must describe the procedures necessary for Postal Service personnel to perform the maintenance on the systems and equipment covered in that chapter. Emphasis must be placed on the method of mechanical control of systems and equipment from a maintenance standpoint. References must be made, as appropriate, to drawings, schematics, and sequences of operation included as part of the construction Contract drawings and specifications that show piping and equipment arrangements and items of control. Prints of these drawings must be reduced to 11 inches x 17 inches for insertion in the manuals. Drawings must represent the "as-built" condition.

- b. Maintenance Procedures: The maintenance procedures must be divided into two categories: Preventive Maintenance and Corrective Maintenance.
  - 1. Preventive Maintenance
    - a. Provide a schedule for preventive maintenance. State, preferably in tabular form, the recommended frequency of performance for each preventive maintenance task (cleaning, inspection, and scheduled overhauls).
    - b. Provide instruction and schedules for all routine maintenance cleaning and inspection, with recommended lubricants.
    - c. If periodic inspection of equipment is required for operation, cleaning, or other reasons, indicate the items to be inspected and give the inspection criteria for, but not limited to, the following:
      - 1.) Fire alarm system
  - 2. Provide instruction for minor repairs or adjustments required for preventive maintenance routines. Minor repair and adjustment must be limited to repairs and adjustments that may be performed without special tools or test equipment and that require no special training or skills. Identify test points and give values for each.
- c. Corrective Maintenance
  - 1. Corrective Maintenance: Corrective maintenance instructions must be predicated upon a logical effect-to-cause troubleshooting philosophy and a rapid replacement procedure to minimize equipment downtime. Instructions and data must appear in the normal sequence of corrective maintenance, for example, troubleshooting first, repair and replacement of parts second, and then the parts list.
  - 2. Troubleshooting: This information must describe the general procedure for locating malfunctions and must give, in detail, any specific remedial procedures or techniques. The data shown are intended to isolate only the most common equipment deficiencies. Troubleshooting tables, charts, or diagrams may be used to present specific procedures. A guide to this type must be a three-column chart. The columns must be entitled Malfunction, Probable Cause, and Recommended Action. The information must be alphabetically arranged by component, and each component must, in turn, list deficiencies that may be expected. Each deficiency must contain one or more problems with a recommended correction.
  - 3. Repair and Replacement: Indicate the repair and replacement procedures most likely to be required in the maintenance of the equipment. Information included here must consist of step-by-step instructions for repair and replacement of defective items. Include all information required to accomplish repair or replacement, including information such as torque values. Identify all tools, special equipment, and materials that may be required. Identify uses for maintenance equipment. The paragraphs must contain headings to identify the topics covered.
  - 4. Safety Precautions: This subsection must comprise a listing of safety precautions and instructions to be followed before, during, and after repairs or adjustments are made or routine maintenance is performed.
- d. Manufacturers' Brochures: Include manufacturers' descriptive literature covering devices used in the system, together with illustrations, exploded views, and renewal parts lists. This section must also include special devices manufactured by the Contractor.
- e. Special Maintenance: Provide information of a maintenance nature covering warranty items that have not been discussed elsewhere.
- f. Shop Drawings: Provide a copy of all approved shop drawings covering approval of equipment for the project with the manufacturers' brochures.

- g. Spare Parts Lists: Include a recommended spare parts list for all equipment furnished for the project. The parts list must include a tabulation of descriptive data for all the electrical-electronic spare parts and all the mechanical spare parts proposed for each type of equipment or system. Each part must be properly identified by part number and manufacturer.
- h. Warranty: Include a copy of the "special" or extended warranty in the operation and maintenance manual.

E. Submittal, In both "hard" and electronic DVD or CD-ROM format:

- 1. Preliminary Submittal: Two draft copies of the completed manuscript for items in this outline must be submitted to the COR for review within 30 days after approval of equipment to be provided. One copy will be returned to the Contractor within 15 days after submittal and, if required, must be revised and resubmitted within 15 days.
- 2. Final Submittal: Six complete sets of manuals must be furnished to the COR not later than 30 days before completion of the project.
- 3. Final Submittal must be accepted by the COR before training can begin.

## 1.2 POSTED OPERATING INSTRUCTIONS

NOT USED

## 1.3 TRAINING

- A. The Contractor must train Postal Service personnel in the operation and maintenance of mechanical and electrical equipment. Coordination must be maintained with systems designers for developing the hours of instruction and scope of material to be covered. Training of Postal Service personnel must not begin until the COR has approved the final submittal copy of each O&M manual.
- B. Schedule Submittal: The proposed scope of training and materials and instruction schedule must be submitted for review and approval approximately 30 days before the scheduled completion of the buildings. Mutually agreeable dates for training must be arranged with the COR, but the training must be completed before final acceptance of the facility.
- C. Scope of Training: Training must include classroom and on-the-job instructions by qualified installation and maintenance personnel having the necessary knowledge, experience, and teaching skills. The use of recording on digital media (DVD or CD discs) during the instruction period is required. Discs must be turned over to the COR after training has been completed.
- D. Time Period of Training: The minimum specific hours of training time required for each category of major equipment and systems is indicated below. Past experience indicates a workable ratio in the vicinity of approximately 25 percent classroom to 75 percent application, except that the ratio may be reversed for control systems. The COR must have the option of redistributing the training times, subject to the total time specified. Training must be presented on an 8-hour per day, 5-day per week schedule, with all reading assignments and review to be within this period.

## 1.4 TRAINING PERIOD

Item	Time (Hours)
1. Fire Alarm System	8 (2 separate 4 hr. sessions to accommodate all 3 maintenance tours.

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## 1.5 TRAINING PARTICIPATION SHEETS

- A. Submit to the COR sign-in sheets with the dates and names of all training participants. Training sheets must be reviewed and certified by an authorized facility manager.

## 1.6 OTHER CLOSEOUT SUBMITTALS

- A. Additional requirements for Systems Manuals, Operating Instructions, Training and other deliverables are contained in individual Specification Sections. All closeout requirements must be provided to and accepted by the COR prior to requesting final payment. Examples of additional closeout requirements include, but are not limited to, the following
  - 1. Final Punch-List with all items certified as complete.
  - 2. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Record "As Built" Drawings*, the Contractor shall submit certified As-Built Record Drawings and Specifications in the quantities and media specified.
  - 3. In accordance with the terms and conditions of the contract provisions and clauses, including those concerning *Warranty*, the Contractor shall submit all transferable guarantees and warranties for equipment, materials and installations furnished by any manufacturer, supplier, or installer.
  - 4. Signed Asbestos and Lead-Based Paint Certificate.
  - 5. RE-4 Certification of Accessibility (CoA) and Facility Accessibility Survey Report.
  - 6. Material Safety Data Sheets.
  - 7. Signed and sealed Contractor Release of Claims.

## PART 2 – PRODUCTS

NOT USED

## PART 3 – EXECUTION

NOT USED

END OF SECTION

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## SECTION 019113

## GENERAL COMMISSIONING REQUIREMENTS

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

- A. Commissioning requirements common to all Sections.
- B. Systems and equipment start-up and functional performance testing.
- C. Validation of proper and thorough installation of systems and equipment.
- D. Equipment performance verification.
- E. Documentation of tests, procedures, and installations.
- F. Training.

## 1.2 SCOPE

- A. The Commissioning ("Cx") Plan outlines the commissioning process outside of the Construction Contract. The specification sections dictate all requirements of the commissioning process relative to the Construction Contract. The Cx Plan is available for reference at the request of the Contractor; however it is not part of the Construction Contract.
- B. This Section and other Sections of the specification detail the Contractor's responsibilities relative to the Cx process and it expands on the Cx Plan, which covers the roles and responsibilities of Parties outside of the Construction Contract. The degree of commissioning that will be required for this project shall include the specific requirements listed in the Division 26 specification.

## 1.3 GENERAL DESCRIPTION

- A. Commissioning ("Cx") is the process of ensuring that all building systems are installed and perform interactively according to the design intent; that systems are efficient and cost effective and meet the Postal Service's operational needs; that the installation is adequately documented; and that the Operators are adequately trained. It serves as a tool to minimize post-occupancy operational problems. It establishes testing and communication protocols in an effort to advance the building systems from installation to full dynamic operation and optimization.
- B. The Postal Service shall retain an independent Commissioning Authority (CxA) to provide Commissioning Services through preapproved vendors.
- C. CxA shall work with the Contractor, the AE, and the Postal Service Project Manager to direct and oversee the Cx process and perform functional performance testing.
- D. The Cx process shall begin at the 95% review of the design documentation for Design/Build (DB), R&A and Design/Bid/Build (DBB) projects. However, the work shall commence at the 30% design stage for special projects, such as Geothermal, Compressed Natural Gas or Electrical Generation Projects.



#### 1.4 RELATED WORK AND DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section
- B. Commissioning Plan: The Cx Plan shall be available for reference as it outlines responsibilities outside of the Construction Contract. It gives the Contractor a perspective as to the overall process. It encompasses the entire Cx process including design phase and post construction tasks.
- C. Section 013300 - Submittal Procedures: Stipulates additional copies of submittals to be submitted and refers to other sections for additional submittal requirements related to Cx.
- D. Section 017704 - Closeout Procedures and Training: Defines the milestones in completion incorporating the Cx process.
- E. Individual Specification Sections: Individual sections stipulate installation, start-up, warranty, O&M documentation, and training requirements for the system or device specified in the Section.

#### 1.5 REFERENCE STANDARDS

- A. ASHRAE Guideline, "Guideline for Commissioning HVAC Systems"
- B. ASHRAE Guideline, "Preparation of Operating and Maintenance Documentation for Building Systems"
- C. AABC Commissioning Group (ACG)
- D. NEBB – Procedural Standards for Building Systems Commissioning
- E. National Electric Code (NEC)
- F. American Society for Testing and Materials (ASTM)
- G. Electronics Industry Association/Telecommunications Industry Association (EIA/TIA)
- H. Illuminating Engineering Society (IES)
- I. Institute of Electrical and Electronics Engineers (IEEE)
- J. International Electrical Testing Association (NETA)
- K. National Electrical Manufacturers Associates (NEMA)
- L. National Fire Protection Association (NFPA)
- M. Underwriters Laboratory, Inc. (UL)

#### 1.6 DOCUMENTATION

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- A. Contractor shall provide to the CxA the following per the procedures specified herein and in other Sections of the specification:
1. Drawings and Data. One hard copy and one electronic copy of Drawings and product data related to systems or equipment to be commissioned. CxA shall review and incorporate comments for Contractor's consideration.
  2. Draft Start-Up Procedures. Contractor shall develop Start-up Procedures for all applicable equipment and systems along with the manufacturer's application, installation and start-up procedures. CxA will initially provide to the Contractor generic Start-up Checklists, the content of which must be reviewed by the Contractor and supplemented with manufacturer-specific requirements and the Contractor's own internal quality assurance procedures and checks. CxA will review draft and recommend approval or provide comments.
  3. Schedule Updates. Issue periodic updates to the construction schedule.
  4. Action Item Response. Respond to Action Items by Cx team members.
  5. Field Testing Agency Reports (other than TAB). Provide all documentation of work of independent testing agencies required by the specification. These shall be provided prior to Acceptance Phase. Field Testing Agency Reports should be provided in PDF electronic format.
  6. Completed Start-Up Procedures. Completed Start-Up Procedure documentation for all applicable equipment and systems.
  7. Equipment Warrantees. Provide prior to the start of the Acceptance Phase.
- B. Record Drawings: Contractor shall maintain at the site an updated set of record or 'As-Built' documents reflecting actual installed conditions and all approved changes and modifications to the contract documents. Contractor shall provide access to the CxA to review the As-Built and Record Drawings. Provide Record Drawings in accordance with Division 1.
- C. Reports. The Cx agent shall provide a final report with executive summary of overall results, description of items commissioned, test data, conclusions, recommendations, etc. to the COR within 14 days after the completion of the commissioning process. If, due to circumstances beyond the control of the Cx agent, the Cx process cannot be completed in accordance with the schedule, then, at the discretion of the COR, a preliminary report shall be submitted detailing the results of the Cx activities completed thus far, with a final report to be submitted at a later agreed upon date.

## 1.7 COMMISSIONING SCHEDULING

- A. The Cx will be categorized into Phases as indicated below. Note that per schedule, different systems and/or areas may be in different phases at any given time given that the Cx and testing process will be integrated into the construction process:
1. Construction Phase: This is the period of time where the systems are installed, much of the Cx documentation is developed, the systems are started, and the majority of the Contractor required training is performed. On any given system or area, the Construction Phase will end when the CxA approves proceeding with the Functional Performance testing.
  2. Acceptance Phase: This is the period of time where the systems will be functionally tested and the systems will operate through an endurance period.
  3. Warranty Phase: This is the period of time that coincides with the start and end of the Contractor's base warranty.

## 1.8 CONTRACTOR RESPONSIBILITIES

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- A. Construction Phase: The Postal Service shall provide independent Cx Services through preapproved vendors. The AE shall be responsible for coordinating with the CxA as necessary to assist them in completing the Cx Report. In particular, the Contractor shall be responsible for providing assistance from their test and balance contractor, BAS controls contractor, mechanical contractor, electrical contractor, etc. to confirm that the functionality of the new equipment meets the original design intent, operates efficiently, and demonstrates that all of the required features of the new system are functioning as specified in the design documents.
- B. Acceptance Phase: The following delineates the Cx-related responsibilities of the Contractor (and their subcontractors) during the Acceptance Phase.
  - 1. Assist CxA in functional performance testing. Assistance will generally include the following:
    - a. Manipulate systems and equipment to facilitate testing.
    - b. Provide any specialized instrumentation necessary for functional performance testing.
    - c. Manipulate systems to facilitate functional performance testing.
  - 2. Correct any work not in accordance with Contract Documents.
  - 3. Maintain record documentation, and update and resubmit it after completion.
- C. Warranty Phase: The following delineates the Cx-related responsibilities of the Contractor (and their subcontractors) during the Warranty Phase.
  - 1. Provide warranty service;
  - 2. Participate as required in opposite season testing;
  - 3. Correct any deficiencies identified throughout the Warranty Phase;
  - 4. Update record documentation to reflect any changes made throughout the Warranty Phase.

#### 1.9 CX KICK OFF/COORDINATION MEETING

- A. CxA shall schedule and conduct a Cx coordination meeting at the appropriate time after the award of the Construction Contract.

#### 1.10 START-UP PROCEDURES AND DOCUMENTATION

- A. Purpose: The Cx process requires that the normal quality control processes involved with preparing systems and equipment for operation are performed to a high standard of care and are thoroughly documented. The Start-up procedures shall be performed to all systems and equipment specified in the Contract documents. The Cx process requires all Parties to collaborate to establish the optimal standard of care for starting systems and equipment. The Contractor performs the Start-up procedures, documents the results, and provides them to the CxA.
- B. Sampling and Final Submission: All systems shall be started and documented per the approved procedures and NO sampling strategy is used. Completed Start-up and prefunctional checklists for all pieces of equipment shall be submitted to CxA prior to any associated functional performance testing.
- C. Postal Service Access: Contractor shall allow access by Postal Service representatives to inspect the equipment and ensure its proper operation.

#### 1.11 FUNCTIONAL PERFORMANCE TESTING

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- A. The objective of Functional Performance Testing is to demonstrate that each system is operating according to the documented design intent of the Contract Documents. Functional Performance Testing facilitates bringing the systems from a state of functional completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
- B. The logistics and procedures involved in Functional Performance Testing are outlined below.

## 1.12 TRAINING

- A. Adequate and thorough training of the Operators and the facilities staff is vital to effective transition and early occupancy of the building. A key goal of the Cx Team is to ensure that this is accomplished. Contractors, Subcontractors, and Manufacturers/Vendors as specified shall prepare and conduct training sessions on the installed systems and equipment for which they are responsible. The Contractor shall be responsible for insuring all other training is performed in accordance with the Contract Documents.

## PART 2 – PRODUCTS

### 2.1 INSTRUMENTATION

- A. All testing equipment used in the Cx process shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. All equipment shall be calibrated according to the manufacturer's recommended intervals. Calibration tags shall be affixed or certificates readily available.
- B. Testing Instrumentation: Contractor shall provide all instrumentation necessary for tests for which they are responsible. CxA will provide standard instrumentation for measuring medium and low voltage electrical voltage, current, power factor, power, and THD. CxA will provide receptacle testers for normal and GFI receptacle tests. Contractor shall provide all other instrumentation required to accomplish the specified testing.
- C. Test kits for meters and gages shall be provided to the Postal Service new. Previously used test kits will be unacceptable. Kits shall be submitted prior to the Acceptance Phase.

## PART 3 – EXECUTION

### 3.1 START-UP STANDARD OF CARE

- A. Procedures that establish a minimum Standard-of-Care for the start-up, check out and testing of applicable equipment are specified in the individual technical specifications. Contractor shall apply this Standard-of-Care and document per the Cx requirements.

### 3.2 START-UP/FUNCTIONAL TEST PROCEDURES - GENERAL

- A. This Section outlines 'generic' or minimally acceptable Start-Up and Functional Test Procedures for systems and equipment. These items shall provide a minimum guideline for the Contractor to determine the level of care required for start-up of the systems.

### 3.3 PROCEDURES COMMON TO ALL SYSTEMS

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The following start-up verifications/procedures are common to all systems.

- A. Checkout shall proceed from devices to the components to the systems.
- B. Verify labeling is affixed per spec and visible.
- C. Verify prerequisite procedures are done.
- D. Inspect for damage.
- E. Verify system is applied per the manufacturer's recommendations.
- F. Verify system has been started up per the manufacturer's recommendations.
- G. Verify that access is provided for inspection, operation and repair.
- H. Verify that access is provided for replacement of the equipment.
- I. Verify the record drawings, submittal data and O&M documentation accurately reflect the installed systems.
- J. Verify all gages and test ports are provided as required by Contract Documents and manufacturer's recommendations.
- K. Verify all recorded nameplate data is accurate.
- L. Verify that the installation is done in a manner that ensures safe operation and maintenance.
- M. Verify specified replacement material/spare parts have been provided as required by the Construction Documents.
- N. Verify all rotating parts are properly lubricated.
- O. Verify all monitoring and ensure all alarms are active and set per Postal Service's requirements.

END OF SECTION

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## SECTION 020800

## ASBESTOS ABATEMENT

## PART 1 - GENERAL

## 1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1, GENERAL REQUIREMENTS, which are hereby made a part of this Section of the Specifications.
- B. Examine all conditions, as they exist at the Site prior to submitting a bid for the work of this Section.
- C. All provisions of this Section relating to the health and safety of workers and the general public, as well as protection of the environment are minimum standards. The Contractor and his Asbestos Abatement Subcontractor are responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and implementing such measures if deemed necessary. Nothing in this Section shall be deemed to relieve the Contractor and his Asbestos Abatement Subcontractor from any liability with respect to any such legal requirements or requirement of prudent conservative practice.
- D. All work under this Section, except as noted herein, shall be performed by a contractor holding a current Massachusetts Department of Labor Standards (DLS) Asbestos Abatement Contractor's license. As used in this Section, the term Asbestos Abatement Subcontractor refers to the Contractor's subcontractor who is so licensed, or the Contractor himself if he holds such a license. Although the term Asbestos Abatement Subcontractor is used throughout this Section, it is not intended to and does not relieve the Contractor of ultimate responsibility for the proper performance and execution of the work of this Section.
- E. The Designer will render certain technical services during the work, including without limitation, the services described at 453 CMR. 6.07 (5) and described within this Section. All services performed by the Designer shall be considered advisory to, and for the sole and exclusive benefit of the United States Postal Service. The Contractor and his Asbestos Abatement Subcontractor acknowledge that the Designer is an independent contractor of the United States Postal Service and agree that no act or omission by the Designer, and no communication by said "Consultant", shall be deemed in any manner to alter or modify the terms of this Contract, or to waive any provision hereof, or to bind the United States Postal Service, unless specifically agreed upon by the United States Postal Service in a signed written instrument.
- F. For the purpose of this Section, the following definitions apply:
  - Site** - Shall refer to the United States Postal Service's Facility located 25 Dorchester Avenue, Boston, Massachusetts.
  - Owner** - Shall refer to the United States Postal Service.
  - Architect/Engineer** - Shall refer to McKinnell McKinnell & Taylor Inc. who will act as the Owner's designated representative for project design and construction administration.
  - Consultant** - TRC who will act as the Owner's representative for the purpose of inspecting, designing, monitoring, and testing for activities governed by this Section.

## 1.2 RELATED REQUIREMENTS

- A. Examine the Contract Documents including all other Sections of the Specifications and Project Drawings for requirements affecting the work of this Section whether or not such work is specifically mentioned in this Section.
- B. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

## 1.3 SUMMARY OF WORK

The following is the General Scope of Work at a minimum, required to be performed by the Contractor for asbestos abatement work in the work areas identified below. The Contractor shall adhere to the Scope of Work outlined below as well as any additional requirements stated herein.

- A. Work area preparation, including pre-cleaning, installation of critical barriers and polyethylene sheeting, construction of decontamination facilities, work area enclosures, sealing, isolation, and other activities as directed by the Consultant.
- B. Installation and operation of HEPA filtration units sufficient to achieve a minimum of four to six air changes per hour in each containment, where required. The exact locations of HEPA filtration units, decontamination units, and other stationary equipment shall be coordinated with other contractors, Owner, and the Consultant.
- C. Removal and disposal of all specified asbestos-containing materials (ACM) and non-ACM as required to complete the work of the Contract Documents.
- D. Pre-cleaning of all asbestos-containing debris, as necessary, in all work areas prior to abatement.
- E. Encapsulation of all abated surfaces in each work area.
- F. Furnishing of all labor, materials, equipment, insurance, and services required for all work included in this Specification.
- G. Compliance with all applicable federal, state, and local regulations, as well as, all requirements set forth in these Specifications.
- H. Decontamination, teardown, and clean up following abatement activities.
- I. Performance of any other work or activities required by this specification, applicable regulations, or as necessary to perform a complete job to the satisfaction of the Owner and Consultant.
- J. The Consultant reserves the right to collect samples of any suspect ACM in order to verify that the asbestos has been satisfactorily removed by the Contractor in accordance with the Specifications.
- K. The Contractor is responsible for conducting all OSHA related safety and structural investigations for general, flooring, and roofing conditions within the Site that could pose a hazard to their workers. The Contractor shall include in their base bid all costs for performing these investigations and corrective measures required to abate any unsafe conditions and protect workers during abatement activities.

- L. The Contractor is responsible for demolition of non-ACM materials required to remove all ACMs specified. Non-asbestos contaminated construction debris may not be stored within asbestos abatement work areas and must be removed from the Site for disposal as general construction debris.
- M. The Contractor is responsible for repair of encapsulation of any friable ACM uncovered or exposed by renovation/demolition that is not removed to complete work of the contract.

#### 1.4 SCOPE OF WORK

- A. All work disturbing ACM shall be in accordance with Section 3.02 of this Specification. Alternative methods of asbestos abatement will only be permitted provided that the Asbestos Abatement Work Plan required in Article 1.07 Submittals has been reviewed and accepted by the Consultant.
- B. All means and methods intended by the Contractor to accomplish the work are subject to the review and acceptance of the Consultant. The Contractor shall prepare and submit a detailed work plan for the removal of all asbestos-containing materials prior to on-site mobilization. The work plan shall be acceptable to the Owner and Consultant.
- C. The following is a summary of the asbestos abatement work items to be performed under the Contract. Given quantities are estimates only and are not guaranteed. Bidders shall not use these estimates as the only basis for their Bid. Bidders shall confirm all quantities and items during the Pre-Bid walkthrough to the extent reasonably possible. The Bidders are responsible to review and confirm all quantities and field conditions (including structural integrity of walking/working surfaces), including locations of all ACM and debris, surface area, lengths, widths, cross-sections, thickness, composition of layers, substrate composition and any attachments thereto, including glue, mastic, compounds, prior to the submission of bids. Neither the Consultant nor the Owner will be responsible for errors or omissions and/or charges for extra work arising from any bidders failure to become familiar with the existing conditions of the site, requirements of the work and the results to be produced. By submitting a Bid, the Bidder further agrees that the descriptions contained herein and on the drawings (i.e., quantities, descriptions, locations, areas, thicknesses, etc.) are adequate and that the bidder will produce the required results. No claims for extra payment due to incorrect quantities will be considered. By submitting a bid, a bidder agrees and warrants that he/she is familiar with and will perform all the work required, including all items indicated herein and/or on the Drawings.

Material	Location	Condition	Estimated Quantity
Floor Tiles and Associated Mastics	Throughout Buildings	Good	See Note 1
HVAC Insulation Anchor Pin Mastic (Dark Brown)	AC#2- SPA Basement AC#1- SPA Basement	Good	See Note 2
Plaster - Enclosure on Structural Supports	SPAA – 1 <sup>st</sup> Floor West Mechanical Mezzanine and 2 <sup>nd</sup> Floor North West Corner Exterior Walls	Good	See Note 3

N



Note 1 – Floor tiles and associated mastics have been identified as ACM by existing survey documentation. ACM flooring materials may be exposed and concealed under carpeting or multiple layers of floor finish materials. Disturbance will be required where new floor penetrations are needed. Any disturbance of ACM floor tile/mastic shall be performed by the Asbestos Abatement Subcontractor.

Note 2 – HVAC insulation anchor mastic is associated with HVAC units and associated duct work. The scope of work for the project is to include removal and replacement of existing HVAC duct smoke detectors in-kind and it is not anticipated that this material will be disturbed by the project. Any disturbance of ACM floor tile/mastic shall be performed by the Asbestos Abatement Subcontractor.

Note 3 – Existing inspection documentation identified this material to be ACM. It is not anticipated that this material will be directly impacted by the project (i.e. Existing electrical conduit and boxes will remain in place. Existing wiring within conduit and boxes is to be removed without disturbing ACM plaster and new fire alarm system components are not to be attached to the ACM plaster). Any disturbance of ACM shall be performed by the Asbestos Abatement Subcontractor.

## 1.5 SEQUENCE OF WORK

- A. The following provisions shall apply for asbestos abatement work as identified by this Section. The Contractor shall apply these general provisions to all work areas throughout the Site. Alternative provisions may be permitted provided that they have been included in the Contractor's written work plan that has been reviewed and accepted by the Consultant.
  1. Prior to the commencement of the work, all stored items and general items in each area, as well as, all movable furnishings and other miscellaneous items in all work areas deemed to be non-contaminated, except as noted herein, shall be removed from each work area by the Contractor. Contractor shall properly handle and or dispose of moved objects as required by the Contract Documents. All non-contaminated non-movable items in all work areas, including but not limited to electrical panels, equipment, shelving, etc. shall be covered with two (2) layers of 6-mil polyethylene sheeting and sealed with duct tape.
  2. A three-chambered decontamination unit shall be erected at the entrance to each work area, where applicable. The three-chambered decontamination unit shall consist of a clean room, a shower room, and an equipment room.
  3. All critical barriers shall be sealed with two (2) layers of six-mil polyethylene sheeting and negative pressure established.
  4. The Contractor shall pre-clean all floor areas, floor drains, and non-movable items of any asbestos debris present. Pre-cleaning shall include the use of wet misting, wet wiping and/or HEPA vacuuming of all affected surfaces.
  5. All work shall be performed in accordance with all federal, state, and local regulations governing asbestos abatement. The Contractor shall assume full responsibility and liability for compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling and disposal of asbestos waste, and protection of workers, visitors to the work site, and persons occupying areas adjacent to the work site.
  6. The scheduling and sequencing of the Work of this Contract shall be determined by the Owner. Multiple and distinct phases needing separate notifications may be required.

## 1.6 COORDINATION OF WORK/TRAINING

- A. Contractor shall coordinate with Owner and the Consultant in ways to minimize disruption of other ongoing activities at the facility. Plan and execute Work in a manner to assist the Owner and other contractors working for the Owner in completing the related scope of work.
- B. The Contractor shall coordinate all work in this Section with all other work of this Project.

- C. Contractor's work schedule must be acceptable to Owner and the Consultant.
- D. All personnel of the Contractor involved with asbestos abatement work must be properly trained and certified by the Commonwealth of Massachusetts prior to any work and shall be thoroughly familiar with the standard operating procedure of the Contractor for abatement work and all applicable regulations governing asbestos abatement work. All personnel shall undergo the medical examinations required by OSHA. All superintendents and the foremen shall be thoroughly familiar with all applicable regulations and practices for asbestos work, and shall have participated in at least three abatement projects during the last two years. All personnel shall be trained in the use and care of respirators and shall pass an OSHA-specified respirator fit test. Anyone without the above qualifications shall not be allowed to work in the abatement area at any time.
- E. All personnel of the Contractor involved with asbestos abatement work must be appropriately badged as deemed necessary by Owner and in accordance with applicable regulations and policies.

## 1.7 SUBMITTALS

- A. Issue submittals in accordance with Division 1 and this Section as outlined below. Submittals under this Section shall include the following documentation. No asbestos abatement shall commence until these items are approved by the Consultant, unless otherwise waived. Submittal data shall be in sufficient detail to enable the Consultant to identify the particular product or equipment, and to form an opinion as to its conformity to the Specifications. Each submittal item shall be identified with a cover page and/or transmittal sheet containing the listed submittal number in the following order. All documents shall be clear and legible originals or copies:
  - 1. Prepare an Asbestos Abatement Plan describing engineering controls and procedures that the Asbestos Abatement Subcontractor will use to conduct the Work of this Section. The plan shall include procedures for removing all asbestos-containing and asbestos-contaminated materials, items and debris.
  - 2. Where applicable the plan shall include, to lockout/tagout and Confined Space Entry Programs with site-specific written plans;
  - 3. Copies of all notifications, permits, applications, licenses, and like documents required by federal, state, or local regulations obtained or submitted in proper fashion;
  - 4. Copies of Contractor's licenses for asbestos;
  - 5. A proposed timetable for the complete job that shows the preparation, removal and disposal, clean up, testing, and teardown portions of the job for each work area. A critical path showing completion dates for each area shall be included;
  - 6. Proof of the abatement supervisor's and workers certification and training, including the most recent refresher course completed and current DLS licenses for asbestos;
  - 7. Written Respiratory Protection Program for employees throughout all phases of the job, including make, model and NIOSH approval numbers of respirators to be used on this specific job;
  - 8. Proof that the asbestos abatement supervisor and workers have been fit-tested within the past twelve months for using both a negative-pressure respirator equipped with HEPA filter cartridges and a PAPR;
  - 9. Proof that the abatement supervisor and workers have been examined by a qualified physician within the past 12 months, and are capable of wearing respiratory protection and are able to perform asbestos abatement work and other related activities;
- B. Before preparations are allowed to begin, the Contractor shall submit the following to the Consultant for approval:

10. Proposed electrical safeguards to be implemented, including but not limited to location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the job, including a description of electrical hazards safety plan for common practices in the work area;
11. A list of all equipment to be used on site, by make and model, including ventilation equipment, HEPA vacuums, etc.;
12. Chain of Command of responsibility at work site including supervisors, foreman, and competent person, their names, and resumes;
13. Proposed Emergency Plan and route of egress from work areas in case of fire or injury, including the name, directions/map and phone number of nearest medical assistance center;
14. The name and address of the Contractor's personal air monitoring and testing laboratory including certification of Massachusetts DLS accreditation and proof of NIOSH proficiency in the asbestos P.A.T. Program;
15. An MSDS or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for all products and materials proposed for use on the project. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated. A copy of the Contractor's complete OSHA Hazard Communication Standard will also be submitted and be kept on site at all times describing the Contractor's Asbestos and Hazardous Materials HazCom Program;
16. A current negative exposure assessment in accordance with OSHA 1926.1101 providing recent data (less than six months old) showing personal exposures to airborne asbestos during operations were work area enclosures will not be established. This data must show that workers' exposures to airborne asbestos on an eight-hour time weighted average (TWA) basis are less than 0.1 fibers per cubic centimeter of air (f/cc);
17. Name, address, and ID number of the asbestos waste hauler, and proposed disposal site(s);
18. Any other documentation that applies and is called for by this or other sections of the specifications;
19. No work on the project will be allowed to begin until Owner and Consultant as listed herein approve the Pre-Job Submittals. Any delay caused by the Contractor's refusal to submit this documentation in a timely manner does not constitute a cause for change order or a time extension;

C. Upon completion of the asbestos abatement work, the Contractor shall submit the following to the Consultant for approval:

1. All manifests and landfill receipts detailing disposal of all asbestos and asbestos-containing waste materials generated by the work.
2. All analytical results of personal asbestos air samples collected in accordance with OSHA regulations to verify that the 8-hour time weighted average (TWA) concentrations of asbestos fibers in the breathing zone of the workers has not exceeded the permissible exposure limit (PEL) of 0.1 f/cc.
3. A copy of the entry-exit logbook.
4. Copy of licenses, medical, and fit tests of all workers and supervisors who performed work on the project.

## 1.8 APPLICABLE STANDARDS/REFERENCES

A. Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

- B. Federal requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the most current version of the following:
1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) including but not limited to:
    - a. Occupational Exposure to Asbestos, Title 29, Part 1926, Section 1101 of the Code of Federal Regulations.
    - b. Occupational exposure to lead, Title 29, Part 1926, Section 62 of the Code of Federal Regulations.
    - c. Respiratory Protection Title 29, Part 1910, Section 134 of the Code of Federal Regulation.
    - d. Construction Industry Title 29, Part 1926, of the Code of Federal Regulations
    - e. Access to Employee Exposure and Medical Records Title 29, Part 1910, Section 20 of the Code of Federal Regulations.
    - f. Hazard Communication Title 29, Part 1910, Sections 120 and 1200 and Title 29, Part 1926, Section 59 of the Code of Federal Regulations
    - g. Specifications for Accident Prevention Signs and Tags Title 29, Part 1910, Section 145 of the Code of Federal Regulations
  2. U.S. Environmental Protection Agency (EPA) including but not limited to:
    - a. Asbestos Abatement Projects Rule 40 CFR Part 762, CPT 62044, FRL 2843-9 Federal Register, Vol. 50, No. 134, July 12, 1985, P28530-28540
    - b. Regulation for Asbestos Title 40, Part 61, Subpart A of the Code of Federal Regulations
    - c. National Emission Standard for Asbestos Title 40, Part 61, Subpart M (Revised Subpart B) of the Code of Federal Regulation.
    - d. Toxic Substances Control Act (TSCA) Title 40, Part 761
    - e. Comprehensive Environmental Response Compensation and Liability Act (CERCLA)
    - f. Spill Prevention Control and Countermeasures Plan (SPCC), 40 CFR, Part 112
    - g. National Pollution Discharge Elimination System (NPDES), 40 CFR Parts 122 through 503
  3. U.S. Department of Transportation (DOT)
    - a. Hazardous Material Regulations, Title 49, Parts 171 -180 of the Code of Federal Regulations.
- C. State Requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:
1. Massachusetts Department of Labor Standards:
    - a. 453 CMR 6.00 - Removal, Containment, and Encapsulation of Asbestos
  2. Massachusetts Department of Environmental Protection:
    - a. Air Pollution Control Regulations Title 310, Chapter 7, Section 7.15 of the Code of Massachusetts Regulations.

- b. Solid Waste Regulations Title 310, Chapter 19 of The Code of Massachusetts Regulations.
- D. Local Requirements: Abide by all local requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials including but not limited to the following:
  - 1. Other state or city agencies as required by law or ordinance.
- E. The Contractor shall post or have available the following items adjacent to the entrance to the work area(s).
  - 1. A copy of the U.S. Environmental Protection Agency Regulations for Asbestos, 40 CFR 61 Subparts A and M; and a copy of OSHA Asbestos Regulations, 29 CFR 1926.1101.
  - 2. A copy of the Massachusetts Department of Labor Standards Regulations for Asbestos, 453 CMR 6.00.
  - 3. A copy of the Massachusetts Department of Environmental Protection Regulations for Asbestos, 310 CMR 7.15.
  - 4. A list of telephone numbers for local hospital, location of hospital and/or emergency squad, fire department, and the name and telephone number of the Consultant.
  - 5. A copy of the abatement specifications.
  - 6. A copy of the respirator protection program which conforms to the requirements of 29 CFR 1910.134(b).
  - 7. A listing of all employees, by name, social security number and Massachusetts Asbestos Abatement Worker or Supervisor/Foreperson Certification Number working on the project.
  - 8. A daily sign in/out log which identifies persons by name and Massachusetts DLS Certification Number, who are/were at the site, and the length of the time each spent at the site.
  - 9. Air monitoring tests and test results as required by OSHA.
  - 10. A copy of the hazard communications program and copies of Material Safety Data Sheets for all chemical compounds used at the Job Site (e.g., spray adhesive, encapsulants, etc.)

#### 1.9 NOTIFICATIONS, PERMITS, WARNING SIGNS

- A. Give the proper Authorities all requisite notices or information relating to the work under this Section. Obtain and pay for all fees, licenses, permits and certificates.
- B. For asbestos abatement work, The Contractor shall prepare and file formal written pre-notification forms for the project with the following agencies. Each notification shall be in a format acceptable to the listed agency, and be filed within the agency's prescribed pre-notification time period. Copies of all notifications shall be concurrently transmitted to the Consultant:
  - 1. Commonwealth of Massachusetts Department of Environmental Protection and Department of Labor Standards
 

c/o Commonwealth Massachusetts  
Asbestos Program  
PO Box 120087  
Boston, MA 02112-0087

(10 working days prior to start of work)
  - 2. Other state, city or town agencies as required by law or ordinance.

- E. Post warning signs around the workspace and at every point of potential entry from the outside. Locate the asbestos warning signs in an approved location. The warning signs shall be a bright color so that they will be easily noticeable. The size of the signs and the size of the lettering shall be no less than OSHA requirements.
- F. Provide any other signs, labels, warnings, and posted instructions that are necessary to protect, inform and warn people of the hazard from asbestos exposure. Post in a prominent and convenient place for the workers a copy of the latest applicable DLS, OSHA, EPA, and NIOSH regulations.
- G. The Contractor has the responsibility of informing himself fully of the requirements of these agencies and shall satisfy completely these Specifications and all reference regulations, and as amended.

#### 1.10 EMERGENCY PRECAUTIONS / SAFETY CONSIDERATIONS

- A. The Contractor shall establish emergency and fire exits whenever possible from all work areas for the workers. All emergency routes shall be clearly marked.
- B. Local medical emergency personnel, including both ambulance crews and hospital emergency room staffs, shall be notified by the Contractor upon arrival at the work site as to the possibility of having to handle contaminated or injured workmen, and shall be advised on safe decontamination methods.
- C. The Contractor shall be prepared to administer appropriate first aid to injured personnel at the site after decontamination. Seriously injured personnel shall be treated immediately in the work area or evacuated without performing decontamination. When an injury occurs, the Contractor shall stop work and implement fiber reduction techniques (e.g., water spraying) until the injured person has been removed from the work area.
- D. This project is subject to compliance with Public Law 91-596, "Occupational Safety and Health Act of 1970" (OSHA), with respect to all Rules and Regulations pertaining to construction, including Volume 36, Numbers 75 and 105, of the Federal Register, as amended, and as published by the U.S. Department of Labor.
- E. In addition to any detailed requirements of the Specification, the Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of federal, state, regional and local authorities regarding handling and storage of asbestos, lead and other hazardous waste materials.
- F. All staging and scaffolding (if needed) shall be furnished and erected by the Contractor in accordance with all applicable requirements, and be maintained in safe condition by him at no additional cost to the Owner.
- G. The Contractor is responsible for using safe procedures to avoid electrical hazards. When a hazard exists, work will be stopped and power will be shut off and checked before work begins again. All electrical panels and exposed wires within the work site shall be de-energized prior to the commencement of any wetting or removal operations. All extension cords and power tools used within the work area shall be attached to Ground Fault Circuit Interrupters (G.F.C.I.) in accordance with 1910.120 and the Contractor's Lockout/Tagout and Confined Space Entry programs.

## 1.11 TEMPORARY FACILITIES

- A. The Contractor shall provide temporary connections to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work. Use qualified, licensed tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the work. Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.
- B. Scaffolding: Provide all scaffolding, ladders and/or staging, etc. as necessary to accomplish the work of this contract. Scaffolding may be of suspension type; or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.
  - 1. Equip rungs of all metal ladders, etc. with an abrasive non-slip surface.
  - 2. Provide a nonskid surface on all scaffold surfaces subject to foot traffic.
  - 3. During the erection and/or moving of scaffolding, care must be exercised so that the polyethylene floor covering is not damaged (where applicable).
  - 4. At the completion of abatement work clean all construction aids within the work area, wrap in one layer of 6-mil polyethylene sheet and seal before removal from the work area
- C. Water Service: The Contractor shall provide temporary hot and cold water service to the Decontamination Unit and throughout the Work Area.
  - 1. Temporary Water Service Connection: Limited water service is available at the facility. Contractor shall coordinate use of water service with the Owner. Water service may be limited to cold water.
  - 2. Water Hoses: Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each work area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment. Maintain hose connections and outlet valves in leak proof condition. Where finish work below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize the possibility of water damage. Drain water promptly from pans as it accumulates.
  - 3. Hot Water Heater: If hot water is not provided by the Facility or if additional capacity is necessary to accomplish the Work properly, provide UL rated electric hot water heater of sufficient size to supply hot water for each Decontamination Unit shower. Activate from 30-amp circuit breaker located within the Decontamination Unit sub-panel. Provide with relief valve compatible with water heater operation; pipe relief valve down to drip pan on floor with type L copper. Wiring of the hot water heater shall be in compliance with NEMA NECA, and UL standards.
- D. Electrical Service: Comply with applicable NEMA, NECA and UL standard and governing regulations for materials and layout of temporary electric service. All temporary connections are subject to the approval of the Owner's electrician. Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity, and power characteristics to accommodate performance of work during the construction period. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work (where applicable).

1. Temporary Power: Limited electrical service is available at the facility. Contractor shall obtain required permits and install temporary connections to the municipal electrical power supply system as needed. Comply with applicable NEC, MA modifications to the NEC, and UL standard and governing regulations for materials and layout of temporary electric service.
2. Voltage Differences: Provide identification warning signs at power outlets which are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets.
3. Ground Fault Protection: Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.
4. Power Distribution System: Provide circuits of adequate size and proper characteristics for each use. In general run wiring overhead, and rise vertically where wiring will be at least exposed to damage from construction operations.
5. Install temporary power panels outside the negative pressure enclosure.
6. Temporary Wiring: In the work area shall be the type UF non-metallic sheathed cable located overhead and exposed for surveillance. Do not wire temporary lighting with plain, exposed (insulated) electrical conductors. Provide liquid tight enclosures or boxes for wiring devices.
7. Provide overload-protected disconnect switch for each temporary circuit located at the power distribution center.
8. For power hand tools and task lighting, provide a temporary 4-gang outlet at each decontamination unit, located in equipment room. Provide a separate 110-120 Volt, 20 Amp circuit for each 4-gang outlet (4 outlets per circuit).
9. Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work.
10. Provide electrical outlets in the decontamination facility clean room, equipment room, and at locations inside and outside the work area as indicated by the Consultant for the exclusive use of the Consultant for air sampling purposes.

## 1.12 SPECIAL CONSIDERATIONS

- A. At the end of each shift or prior to leaving the work area unattended, the asbestos abatement contractor shall ensure that all loose ACM is properly wetted and containerized.
- B. The Asbestos Abatement Contractor and/or the General Contractor shall ensure the building and work area are secured at the end of each work shift.
- C. All Contractor employees working at the site shall be appropriately badged as required by Owner and outlined in the Contract Documents.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Deliver all materials and equipment to the site in the original containers bearing the name of the manufacturer.
- B. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner which shall not interfere with the operations of the Owner, Consultant or the facility.
- C. Unloading and transfer routes, must be approved in advance by Owner and Consultant.



- D. Damaged or deteriorated materials may not be used and must be promptly removed from the premises. Material which becomes contaminated with asbestos-containing material shall be packaged and legally disposed of in an approved, secure landfill.
- E. All materials, tools, and equipment must comply, at a minimum, with this specification, and relevant federal, state, and local codes.

## 2.2 MATERIALS, TOOLS, AND EQUIPMENT

- A. The Contractor shall provide new materials and new or used equipment in undamaged and serviceable condition. Only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards, are to be used during the project.
- B. Fire Extinguishers: The Contractor shall provide multi-purpose ABC minimum rating to A40BC fire extinguishers. The Contractor shall comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers." Fire extinguishers shall be located where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher inside each work area in the Equipment Room and one outside each work area in the Clean Room.
- C. Construction Lumber: Construction lumber for critical barrier walls shall consist of nominal, fire-retardant, 2" x 4" framing, sixteen inches center to center.
- D. Plastic Sheetting: The Contractor shall provide non-combustible, fire-retardant, 6-mil thick clear, frosted, or black plastic sheeting in the largest size possible to minimize seams in accordance with state and local fire department requirements. Spray plastic will not be allowed for use on this project.
- E. Adhesive Materials: The Contractor shall provide duct tape in 2" or 3" widths, with an adhesive that is formulated to aggressively stick to plastic sheeting. The Contractor may also provide spray adhesive in aerosol cans that is specifically formulated to stick tenaciously to plastic sheeting.
- F. Shower Assembly:
  - 1. The Contractor shall provide a leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3' x 3' square with minimum 6' high sides and back. The Contractor shall structurally support the unit as necessary for stability and equip it with a hose bib, mounted at approximately 4'-0" above drain pan.
  - 2. The Contractor shall provide a factory made shower-head producing a spray of water that can be adjusted for spray size and intensity. The Contractor shall feed shower with water mixed from hot and cold supply lines, arranged so that control of water temperature, flow rate, and shutoff is from inside shower without outside aid.
  - 3. The Contractor shall provide a totally submersible waterproof sump pump with an integral float switch. The unit shall be sized to pump two times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. The unit shall be capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. The Contractor shall adjust float switch so that a minimum of 3" remains between top of liquid and top of sump pan.

- G. Negative Air Filtration System: The Contractor shall provide air-filtering equipment capable of filtering particles to 0.3 micrometers at 99.97% efficiency and of sufficient quantity and capacity to cause a complete air change within the work area at least once every 15 minutes. Such equipment shall exhaust the filtered air so as to maintain a negative pressure inside the work area. Air shall flow in through the Decontamination Unit and exhaust through the negative air filtration unit by means of flexible duct leading outside the work area, preferably outside of the building. Negative air filtration shall be in operation at all times.
- H. Fan and Leaf Blower: Provide one 20" diameter fan per 10,000 cubic feet of work area volume and one leaf blower to be used for aggressive sampling techniques and for clearance air testing.
- I. HEPA Vacuum: The Contractor shall utilize high efficiency filter vacuums to filter particles of 0.3 micrometers or larger at 99.97% efficiency or greater. The Contractor shall obtain HEPA vacuum attachments, such as various size brushes, crevice tools, and angular tools to be used for varied application, and service the HEPA vacuum routinely to assure proper operation. HEPA vacuums shall be emptied of contents prior to removal from the work area. Vacuuming by conventional means is unacceptable.
- J. Amended Water: For wetting prior to disturbance of asbestos-containing materials, the Contractor shall use an amended water solution. The Contractor shall provide water to which a commercial surfactant (i.e., not dish detergent) has been added. The Contractor shall use a mixture of surfactant and water, which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material, equal to or greater than that provided by the use of one ounce of a surfactant, consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.
- K. Waste Containers Disposal Bags/Drums: The abatement contractor shall provide 6 mil thick leak-tight polyethylene bags labeled with required EPA, DOT, OSHA labels for asbestos waste. If the waste material contains sharp edges or may otherwise puncture polyethylene bags, provide drums or other closed containers for storage, transportation, and disposal.
- L. Temporary Waste Storage Vehicle/Container: Totally enclosed vehicle or container that is designed, constructed, and operated to prevent spills, leaks, or emissions.
- M. Filters: Provide cascaded filter units on drain lines from showers or any other water source carrying asbestos contaminated water from the work area. Provide units with disposable filter elements as indicated below. Connect so that discharged water passes primary filter and output of primary filter passes through secondary filter.  
  
  - Primary Filter - Pass particles 20 microns and smaller
  - Secondary Filter - Pass particles 5 microns and smaller.
- N. Warning Signs and Labels: Shall comply with 29 CFR 1926.1101, and all other federal, state, or local codes and regulations.
- O. Ladders or Scaffolds: Shall be OSHA-approved, and be of sufficient dimensions and quantities so that all work surfaces can be easily and safely accessed by the Consultant, workers, and other inspectors. Scaffold joints and ends shall be sealed with tape to prevent incursion of asbestos fibers.
- P. Hand Power Tools: Shall be equipped with HEPA-filtered local exhaust ventilation if used to drill, cut into, or otherwise disturb ACM.

- Q. Brushes: All brushes shall have nylon bristles. Wire brushes are excluded from use due to their potential to shred asbestos fibers into small fibers. Wire brushes may be used on pipe joint applications upon prior written approval by the Consultant.

### PART 3 - EXECUTION

#### 3.1 GENERAL CONSIDERATIONS

- A. All temporary facilities, work procedures, equipment, materials, services, and agreements must be strictly adhere to and meet these contract specifications along with EPA, OSHA, NIOSH, regulations and recommendations as well as any other federal, state, and local regulations. Where there exists overlap of these regulations, the most stringent one applies.
- B. Approvals and Inspection: All work performed by the Contractor is further subject to approval of the Consultant. Modifications to these isolation and sealing methods, procedures, and design may be considered if all elements of proper and safe procedures to prevent contamination and exposure can be demonstrated. Written modifications to these specifications must be made to the Consultant for review before they can be used for work on this project.
- C. Damage and Repairs to The Work Site: Abatement and disposal shall be performed without damage to the buildings, including, but not limited to, structural members, ceilings, walls, pipes, duct work, light fixtures, etc., except where specified. The Contractor shall provide protection of these items and materials as part of the work area preparation. The Contractor shall not perform any demolition activity that could result in the loss of integrity of any building or equipment-related structural member. Where asbestos abatement activity causes damage, the Contractor shall patch, repair, replace or otherwise restore same to its original condition at no additional cost to the Owner.
- D. Barriers and Isolation Areas
1. The Contractor shall construct and maintain suitable critical barriers within the building to separate work areas from spaces occupied by the Owner. Critical barriers shall be of sufficient size and strength to prevent building occupants, the public, and others from entering the work areas.
  2. Warning signs shall be posted on all critical barriers at the commencement of the work area preparation, as required in 1926.1101 of the Occupational Safety and Health Standards.
  3. The signs shall display the proper legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in OSHA Standard 1926.1101. The signs will read as follows:

**DANGER  
CONTAINS ASBESTOS FIBERS  
MAY CAUSE CANCER  
CAUSES DAMAGE TO LUNGS  
DO NOT BREATHE DUST  
AVOID CREATING DUST**

4. The signs shall be posted at the perimeters of asbestos removal, demolition or construction areas where the asbestos-containing material to be removed exists.
5. The Contractor shall maintain all temporary and critical barriers, facilities and controls as long as necessary for the safe and proper completion of the work. All containments shall consist of floors and walls covered with 2 layers of 6-mil poly sheeting, except in those instances where such floors are deemed impervious by the Consultant.

6. Any breaches in the containment will be corrected at the beginning of each shift and as necessary during the workday. Work will not be allowed to commence until all control systems are in place and operable.
7. No barriers shall be removed until the work areas are thoroughly cleaned and all debris has been properly bagged and removed from work areas, and the air has passed final clearance tests, in accordance with provisions detailed herein.

### 3.2 ASBESTOS REMOVAL UNDER GENERAL CONTAINMENT PROCEDURES

- A. This section covers the removal of ACM where conducted inside of a removal area which has been isolated and protected with polyethylene coverings, and has a HEPA exhaust system and 3-room Decontamination Facility.
- B. Amended water (wetting agent) mixed and carefully applied using an airless sprayer as specified by the manufacturer, shall continuously be used to control the release of asbestos fibers from the friable material prior to and during removal. The amended water shall be applied in sufficient quantity to fully penetrate and saturate the friable material before it is removed. Where necessary, wetting shall commence up to 24 hours before removal work to ensure effectiveness.
- C. Removal Methods:
  1. No asbestos removal work shall begin until the work area has been prepared and approved by the Consultant as summarized in preceding sections. Removal workers shall wear respirators and protective clothing as previously described throughout all removal, cleanup, and waste handling operations.
  2. Small test patches of asbestos material shall be wetted, and then removed and examined by the Consultant and Supervisor to determine degree of saturation prior to removing the bulk of the material. With prior approval, the Contractor may use removal encapsulants instead of amended water-applied per manufacturer's and federal guidelines. The use of power wash equipment for removal of asbestos materials will not be allowed.
  3. After large areas of the asbestos material have been fully wetted and tested, the asbestos shall be carefully removed in small sections by hand using scrapers or other suitable tools.
  4. As the material is removed, it shall be promptly wetted and packed into impermeable, labeled 6-mil polyethylene disposal bags. When each bag is full, the packaged material shall be sprayed with amended water, sealed, and transported to a temporary storage area inside of the work area. Accumulations of standing or free water shall not be allowed to collect on the work area floor.
  5. If the asbestos material is located on surfaces higher than 10 feet above the floor, the Contractor shall provide closed chutes (with maximum incline of 60 degrees from horizontal), or scaffolding for waste containers to prevent dropping material down to the floor during removal.
  6. Piping insulation/ACM which passes through walls, sleeves, ceilings or floors shall be completely removed.
  7. The Contractor shall repeatedly spray the friable material to prevent it from drying out.
  8. Once all of the asbestos is removed, the Contractor shall scrub the substrate surface with a nylon brush or equivalent, and a water spray, and then thoroughly wash it to remove any remaining asbestos. Power wash or other equipment may be used at this point if the Contractor submits plans for its use, including collection of all water, to the Consultant for approval.
  9. The Contractor shall minimize contamination of the work floor, the exterior of disposal containers, and all other surfaces within the work area. At the end of each shift, all surfaces shall be cleaned of all materials and then HEPA vacuumed or wet mopped.
  10. Containerized ACM waste shall be removed from the work area at least once per shift.

11. Excessive water accumulation or flooding in the work area shall require work to stop until the water is collected and disposed of properly.
12. HEPA vacuums shall be emptied of contents prior to removal from the work area.
13. Air filtration devices shall have used pre-filters removed and replaced with new filters prior to removal from work area.
14. The decontamination facility shall be wet cleaned twice using wet cleaning methods upon completion of any waste removal.
15. Unless otherwise permitted by the Consultant, the Contractor shall then seal all substrate surfaces from which asbestos material was removed with at least one (1) coat of an approved penetrating encapsulant using low pressure airless spray equipment.
16. Work areas shall be subject to the visual inspection and air monitoring requirements of Section 3.6. The work areas isolation and control measures shall not be dismantled or deregulated until the requirement of Section 3.6 have been met.

### 3.3 ASBESTOS WASTE DISPOSAL PROCEDURES

- A. The Contractor shall package, label, and remove all asbestos waste from the work area in accordance with applicable regulations and as specified below. Packaging shall be accomplished in a manner that minimizes waste volume, but insures waste containers shall not tear or break. Transportation and disposal of the containerized waste at an approved landfill shall be the responsibility of the Contractor. The Owner shall be designated as the generator on all waste manifests.
- B. Asbestos waste is defined as all asbestos-containing or potentially contaminated materials or other items which have not been completely cleaned or sealed to the satisfaction of the Consultant while inside the work area, and must be removed from the job site. Asbestos wastes may include building materials, insulation, disposable clothing and protective equipment, plastic sheeting and tape, contractor equipment, or other materials designated by state or local authorities or the Consultant which have been potentially contaminated with asbestos and have not been fully cleaned inside the work area by HEPA vacuuming followed by thorough washing.
- C. Waste Packaging: All waste material shall be promptly placed in 6-mil polyethylene bags as it is generated. A sufficient number of waste bags shall be located in the immediate work area. If the waste material contains sharp edges or may otherwise puncture polyethylene bags, provide drums or other closed containers for storage, transportation, and disposal. The Contractor shall count or measure the volume of each filled container leaving the work area, and maintain a written record of such.
- D. Waste Labeling: Warning labels, having waterproof print and permanent adhesive in compliance with OSHA, EPA, NESHAPS, U.S. Department of Transportation (DOT), and State requirements, shall be affixed to or printed on the sides of all waste bags or transfer containers
- E. Wetting of Waste: A fine water spray shall be used to keep the top layers of waste in containers thoroughly wet at all times. When a waste bag is full, it shall be securely sealed with tape or other secure fastener.
- F. Waste Container Decontamination and Removal Procedure: The following procedures shall be followed whenever containers or equipment are removed from the work area:
  1. Waste removal shall not occur during worker shift changes or when workers are showering or changing.
  2. All waste shall be thoroughly decontaminated prior to removal from the work area.
  3. Containerized ACM waste shall be removed from the work area at least once per shift.

- G. Waste Container Storage: Sealed waste bags may be temporarily stored at the Site. Waste container storage shall consist of secured, totally enclosed vehicle or containers that are designed, constructed, and operated to prevent spills, leaks, or emissions in accordance with 310 CMR 7.15.
- H. Waste Transportation and Disposal Regulations: It is the responsibility of the Contractor to determine and insure that he is complying with:
  - 1. Current waste handling regulations applicable to each work site.
  - 2. Current regulations for transporting and disposing waste at each ultimate disposal landfill. The Contractor must comply fully with these regulations; and with all EPA, U.S. Department of Transportation, State, and local requirements.
- I. Where required, the Contractor's waste transporter and disposal contractor shall maintain a valid hazardous waste transporter's permit and identification number; and obtain, complete, and fully comply with any other local hazardous waste manifesting requirements. All waste receipts, signed by landfill operator, shall be submitted to Owner at time of request for final payment.

### 3.4 HOUSEKEEPING

- A. Throughout the work period, the Contractor shall maintain the building and site in a standard of cleanliness as specified throughout these specifications.
  - 1. Contaminated disposable clothing, respirator filters, and other debris shall be bagged and sealed at the end of each workday.
  - 2. All asbestos generated by either removal or repair shall be bagged immediately and not be allowed to be left exposed at the end of each workday.
  - 3. Respirators shall be thoroughly cleaned at the end of each workday and stored for the next day's use.
  - 4. The Contractor shall retain all stored items in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection materials.
  - 5. The Contractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for completion of the work.
  - 6. The Contractor shall provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
  - 7. Daily, and more often if necessary, the Contractor shall inspect the work areas and adjoining spaces, and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
  - 8. The Contractor shall maintain the site in a neat and orderly condition at all times.

### 3.5 INSPECTION AIR MONITORING AND WORK CLEARANCE BY CONSULTANT

- A. The Consultant will review Contractor's work practices prior to the start of and periodically during asbestos related work and will report any noted violations of the requirements of this Section to the Contractor. If the Contractor fails to correct deficiencies in a timely manner, the Consultant will be notified in writing, and work may be stopped. The Consultant will review the containment structure and negative air conditions before work begins and after the Contractor Site Supervisor has given approval. Outside containment airborne fiber concentrations must not exceed 0.010 fibers/cc or pre-abatement levels, whichever is greater. If concentrations exceed this level, then work must be stopped, conditions reviewed as to the probable cause, and then corrected.
- B. Background (pre-testing) air and appropriate dust samples may be taken to represent conditions before the Contractor starts masking and sealing operations.

- C. During removal, area samples will be collected by the Consultant outside major openings in the containment: in the clean room, at other critical points outside the work areas, just outside the clean room, inside the contained work sites, and at HEPA exhaust locations. Contractor shall be responsible for all OSHA personal sampling.
- D. At completion of all asbestos removal work and prior to removing containment and engineering controls, the Consultant will conduct a final visual inspection of the work area. The area must be free and clear of any visible debris. At the option of the Consultant, the Consultant may obtain representative substrate samples to confirm complete removal of all asbestos. Substrates that may be sampled by the Consultant include, but are not limited to, concrete ceilings or floors from which mastics or glue dots were removed. The Consultant will analyze substrate samples by polarized light microscopy in accordance with EPA protocols. If trace amounts or greater of asbestos is detected in any one sample, or if visual debris is present, then the Consultant will not consider the asbestos removal work complete. The Contractor shall be required to re-clean the designated work site and then the Consultant will repeat the final inspection prior to conducting clearance air testing.
- E. Final clearance air samples will be collected inside the contained removal work area after the visual inspection has determined that the area is free and clear of any suspect material. Final clearance air testing will be conducted in accordance with the requirement of Massachusetts DLS regulations 453.CMR 6.00. Contractor shall provide sufficient electrical power and connections as needed for the Consultant to conduct the required air sampling.
- F. The final clearance air sampling shall consist of taking air samples in the workspace to establish that contamination levels do not exceed 0.010 f/cc as determined by NIOSH Method 7400. Air shall be agitated by means of a small leaf blower prior to the test, and kept agitated by means of 20" electric fans. The results of all samples must be less than 0.010 fibers per cubic centimeter (f/cc) for PCM analysis in compliance with clearance criteria as described in this Section and Massachusetts DLS regulations. The first set of final clearance air tests for each removal area will be paid by the Owner. In the event that these air tests do not pass the clearance criteria, any subsequent air tests that need to be performed shall be paid for by the Contractor. If the Contractor fails to meet the criterion, the Contractor shall be required to re-clean the designated work site and then the Consultant will repeat the final air clearance testing. Cleaning and testing shall be repeated until the specified criterion is met.

### 3.6 AIR MONITORING BY CONTRACTOR

- A. The Contractor shall perform air monitoring as required to meet OSHA requirements as outlined in 1926.1101 and 1910.134 for maintenance of Time Weighted Average (TWA) fiber counts and airborne concentrations for types of respiratory protection provided. Consultant will not be performing air monitoring to meet these OSHA requirements.
- B. The sampling person and analysis laboratory performing this work shall be an independent party not financially or managerially connected to the Contractor.
- C. For asbestos air sample analysis, the laboratory shall be successfully participating in the AIHA/NIOSH Proficiency Analytical Testing (PAT) program and be certified by the Commonwealth of Massachusetts.

- D. Air sampling materials and equipment requirements are as follows:
1. Sampling for analysis by phase contract microscopy shall employ cellulose ester collection filters with 0.8 micron pore size or less. Cassettes shall be loaded with filters under clean laboratory conditions. A 5.0 micron pore-size cellulose ester backing filter shall be placed behind the collecting filter, followed by the cellulose support pad and the cassette base. A metal cowl or an electrically conductive cowl shall be used in conjunction with the sampling train.
  2. The filter assembly shall be upstream of all other components in the sampling train. An airflow measuring device shall be downstream of the filter and the pump assembly, or integral with the pump assembly.
  3. Sampling pumps shall supply constant flow
  4. An airflow measuring/metering device shall be used, and shall be high quality rotometer, mass flow, dry gas meter or critical orifice. This device shall be traceable to a primary NIST standard. Measuring devices shall have a range of at least 1.5 times the desired flow rate and be readable to at least + 5% of the desired flow rate. These shall be calibrated against standards of higher accuracy before and after sampling. The calibrations shall be recorded.
- E. Numbers and frequencies of person air sampling shall be as required by OSHA regulations but not less than one (1) sample per eight (8) hour work shift during times of all asbestos removal work.
- F. Asbestos personal sampling shall be performed using the OSHA Reference Method (ORM).
- G. The Contractor shall use a pre-approved "chain-of-custody" form for all personal air samples he collects.
- H. Results of sample analysis shall be provided to the Consultant within twenty four (24) hours of collection.
- I. The Contractor shall at no additional charge install and provide AC power for the Consultant to collect final air clearance samples as required herein.
- J. The Contractor shall also provide general surveillance at each work area to observe that the "no visible emissions" requirement of this Specification is enforced at each work area.

### 3.7 APPROVAL OF REMOVAL WORK

- A. Upon completion of removal work and cleaning of the work area, but prior to encapsulation, the Contractor shall request the Consultant to conduct an inspection and approval of the removal work.
- B. Following approval and attainment of acceptable clearance criteria, the Contractor shall dismantle the containment and properly dispose all polyethylene sheeting, tapes, sealants, etc.
- C. Following the completion of the project, the Contractor shall remove all equipment, materials, dumpsters, etc. from the work site in a timely fashion.

END OF SECTION 020800



## SECTION 020900

## LEAD PAINT HAZARD CONTROL

## PART 1 - GENERAL

## 1.1 SCOPE

- A. Work under this item shall include the special handling measures and work practices required for renovation and demolition (construction) activities impacting various materials covered by lead paint, including the loading, transportation and final off-site disposal of non-hazardous and/or hazardous lead construction and demolition waste, the recycling of metallic components covered with lead paint, and the subsequent cleaning of the affected environment. Lead paint includes paint found to contain any detectable amount of lead by Atomic Absorption Spectrophotometry (AAS) or X-Ray Fluorescence (XRF).
- B. All activities shall be performed in accordance with, but not limited to, the current revision of the Occupational Safety and Health Administration (OSHA) Lead in Construction Regulations (29 CFR 1926.62), the United States Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Hazardous Waste Regulations (40 CFR Parts 260 through 274), the Massachusetts Safety Procedures for Renovation and Occupational Lead Exposure Regulations (454 CMR 22.11 and 23.00), and the United States Department of Transportation (DOT) Hazardous Materials Regulations (49 CFR Parts 171 through 180).
- C. As used in this Section, the term Contractor refers to the Contractor and its subcontractor. The Contractor is responsible for ensuring that their subcontractors perform work in accordance with applicable regulations governing lead paint and this Section.
- D. All activities shall be performed by individuals with appropriate levels of OSHA lead awareness and hazard communication training and shall be supervised by the Contractors Competent Person on the job site at all times. The Contractors Competent Person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- E. Deviations from these Specifications require the written approval of the Owner or the Owner's Representatives.
- F. For the purpose of this Section, the following definitions apply:

**Site** - Shall refer to the United States Postal Service's Site located at 16 Cummins Highway, Roslindale, Massachusetts.

**Owner** - Shall refer to the United States Postal Service.

**Architect/Engineer** - Shall refer to McKinnell McKinnell & Taylor Inc. who will act as the Owner's designated representative for project design and construction administration.

**Consultant** - Shall refer to TRC who will act as the Owner's representative for the purpose of inspecting, designing, monitoring, and testing for activities governed by this Section.

## 1.2 DESCRIPTION OF WORK

- A. The procedures described herein apply to all renovation/demolition work where a worker may be occupationally exposed to lead as well as to the disposal of the renovation/demolition debris. The Contractor shall assume that any painted surface not tested shall be assumed to contain lead and it shall be the Contractor's responsibility to protect workers performing under this Contract. This may require additional testing by the Contractor to verify lead content.
- B. The Contractor shall assume full responsibility and liability for their employees and subcontractors for the compliance with all applicable federal, state and local regulations pertaining to work practices, safety, health, hauling and disposal of hazardous waste. This shall include protection of workers, visitors, and persons occupying areas adjacent to Contractors work area(s), well as protecting the public and the environment from exposure to lead dust.
- C. The Bidders are responsible for determining waste stream and classification as hazardous or non-hazardous prior to submission of their bid. Neither the Owner nor the Owner's Representatives will be responsible for errors or omissions and/or charges for extra work arising from any bidders failure to become familiar with the existing conditions of the site, requirements of the work and the results to be produced. By submitting a Bid, the Bidder further agrees that the descriptions contained herein and on the drawings (i.e., quantities, descriptions, locations, areas, thicknesses, etc.) are adequate and that the bidder will produce the required results. No claims for extra payment due to changes in waste stream classification will be made. By submitting a bid, a bidder agrees and warrants that he/she is familiar with and will perform all the work required, including all items indicated herein and/or in the Contract Documents.
- D. Data from lead paint testing conducted on representative paint coated surfaces throughout the building identified that lead is present in paint. The testing data is extensive and is available at the Site for review. Under no circumstances shall this information be the sole means used by the Contractor for determining the extent of lead painted materials. The Contractor shall be responsible for verification of all field conditions affecting performance of the work as described in these Specifications in accordance with OSHA, EPA, DOT and Massachusetts standards and regulations. Compliance with the applicable requirements is solely the responsibility of the Contractor.

## 1.3 SUBMITTALS AND NOTICES

- A. Provide copies of the following Submittals as required by Specification Section General Requirements for the review of the Owner and the Owner's Representatives:
  - 1. Work plan for work impacting lead paint including engineering controls, methods of containment of debris and work practices to be employed, as needed, to minimize employee exposure and prevent the spread of lead contamination outside the Regulated Area.
  - 2. Negative exposure assessments conducted within the previous 12 months documenting that employee exposure to lead for each task is below the OSHA Action Level of 30  $\mu\text{g}/\text{m}^3$ . If a negative exposure assessment has not been conducted, the Contractor shall submit its air monitoring program for the work tasks.
  - 3. Copies of all employee certificates, dated within the previous twelve (12) months, relating to OSHA lead awareness and hazard communication training,
  - 4. Name and qualifications of Contractor's OSHA Competent Person under 29 CFR 1926.62.
  - 5. Documentation from the Contractor, typed on company letterhead and signed by the Contractor, certifying that all employees engaged in lead paint tasks have received the following:

- a. medical monitoring within the previous twelve (12) months, if required in 29 CFR 1926.62;
    - b. biological monitoring within the previous six (6) months, if required in 29 CFR 1926.62;
    - c. respirator fit testing within the previous twelve (12) months, if required in 29 CFR 1910.134 (for those who don a tight-fitting face piece respirator)
  - 6. Waste Disposal Plan which describes the waste stream and the disposal means (i.e. landfill, recycle, etc.) and includes the name, address, and ID number of the proposed hazardous waste hauler, waste transfer route, and proposed disposal reclamation or treatment facility.
  - 7. Name and address of the proposed construction debris site,
  - 8. Names of the proposed scrap metal recycling facilities including documentation stating that the selected facility is able to accept lead paint coated scrap metal.
- B. Provide the following to the Owner and Owner's Representatives, within thirty (30) days of completion of the project:
- 1. Copies of waste manifests and receipts acknowledging disposal of all lead waste material from the project, showing delivery date, quantity, and appropriate signature of landfill's authorized representative.
  - 2. DEP approval for all waste reduction techniques, if utilized,
  - 3. A copy of the daily list of workers and site entry-exit logbook,
  - 4. All personnel monitoring results,
  - 5. All TCLP testing results.

## PART 2: PRODUCTS

### 2.1 MATERIALS

- A. All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description, with MSDS sheets as applicable.
- B. No damaged or deteriorating materials shall be used. If material becomes contaminated with lead, the material shall be decontaminated or disposed of as lead-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.
- C. Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating six (6) mil thickness.
- D. Polyethylene disposable bags shall be six (6) mils thick.
- E. Tape (or equivalent) capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.
- F. Cleaning agents and detergent shall be lead specific, such as TriSodium Phosphate (TSP).
- G. Any chemical strippers and chemical neutralizers to be utilized shall be compatible with the substrate as well as with each other. Such chemical strippers shall contain less than 50% volatile organic compounds (VOCs) in accordance with RCSA 22a-174-40 Table 40-1.

- H. Labels and warning signs shall conform to OSHA 29 CFR 1926.62, EPA 40 CFR 745, EPA 40 CFR 260 through 274 and DOT 49 CFR 172 as appropriate.
- I. Any planking, bracing, shoring, barricades and/or temporary sheet piling, necessary to appropriately perform work activities shall conform to all applicable federal, state and local regulations.
- J. Air filtration devices and vacuum units shall be equipped with HEPA filters.

## 2.2 TOOLS AND EQUIPMENT

- A. The Contractor shall provide tools and equipment that are suitable for lead paint related activity:
  - 1. Air monitoring equipment of the type and quantity required to monitor operations and conduct personnel exposure surveillance in accordance with OSHA requirements.
  - 2. Electrical equipment, protective devices and power cables shall conform to all applicable codes.
  - 3. Where lead exposures are above the OSHA Action Level or PEL, the Contractor shall provide wash facilities/shower stalls and plumbing that include sufficient hose length and drain system or an acceptable alternate. One shower stall shall be provided for each eight workers.
  - 4. Where lead exposures are above the OSHA PEL, the Contractor shall provide exhaust air filtration units that are equipped with HEPA filters to provide local exhaust ventilation at the work area to reduce airborne lead emissions.
  - 5. The Contractor shall provide vacuum units of suitable size and capabilities for the project which have HEPA filters capable of trapping and retaining at least 99.97 percent of all monodispersed particles of three micrometers in diameter or larger. HEPA vacuums shall also be equipped with a beater bar.
  - 6. The Contractor shall provide ladders and/or scaffolds of adequate length, strength and sufficient quantity to support the work schedule. Scaffolds shall be equipped with safety rails and kick boards in compliance with OSHA requirements.
  - 7. Protective clothing, respirators, and HEPA P100 filter cartridges shall be provided in sufficient quantities for the project.
  - 8. Equipment suitable for building renovation/demolition and proper waste/debris collection/packing/removal, (e.g. excavators, grapples, backhoes, roll-offs, etc.) shall be provided by the Contractor as required.

## PART 3: EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. All employees of the Contractor who perform work impacting lead paint shall be properly trained to perform such duties. In addition, the Contractor shall instruct all workers in all aspects of personnel protection, work procedures, emergency evacuation procedures and use of equipment including procedures unique to this project.
- B. Contractor shall provide all labor, materials, tools, equipment, services, testing, insurance (with specific coverage for work on lead), and incidentals which are necessary or required to perform the work in accordance with applicable governmental regulations, industry standards and codes, and these Specifications.
- C. Prior to beginning work, the Owner or Owner's Representative may perform a visual survey of each work area and review conditions at the site.

- D. As necessary, the Contractor shall:
1. Shut down and lock out electrical power, including all receptacles and light fixtures, when feasible. The use or isolation of electrical power will be coordinated with all other ongoing uses of electrical power at the site.
  2. When necessary, provide temporary power and adequate lighting and ensure safe installation of electrical equipment, including ground fault protection and power cables, in compliance with applicable electrical codes and OSHA requirements. The Contractor is responsible for proper connection and installation of electrical wiring.
- E. Ladders and/or scaffolds to be utilized throughout this project shall be in compliance with OSHA requirements, and of adequate length, strength and sufficient quantity to support the scope of work. Use of ladders/scaffolds shall be in conformance with OSHA 29 CFR 1926 Subpart L and X requirements.
- F. Work performed at heights exceeding six feet (6') shall be performed in accordance with the OSHA Fall Protection Standard 29 CFR 1926 Subpart M including the use of fall arrest systems as applicable.
- G. If adequate electrical supply is not available at the site, the Contractor shall supply temporary power. Such temporary power shall be sufficient to provide adequate lighting and power the Contractor's equipment. The Contractor is responsible for proper connection and installation of electrical wiring and shall ensure safe installation of electrical equipment in compliance with applicable electrical codes and OSHA requirements.
- H. If water service is not be available at the site for Contractor's use, the Contractor shall supply sufficient water for each shift to operate the wash facility/decontamination shower units in addition to the water needed at the work area.
- I. The Owner or Owner's Representative may provide a Project Monitor to monitor compliance of the Contractor. In such cases no activity impacting lead paint shall be performed until the Project Monitor is on-site. Environmental sampling, including ambient air sampling, TCLP waste stream sampling and/or dust wipe sampling, will be conducted by the Project Monitor as deemed necessary throughout the project. Air monitoring to comply with the Contractor's obligations under OSHA remains solely the responsibility of the Contractor.
- J. If air samples collected outside of the Regulated Area during activities impacting lead paint indicate airborne lead concentrations greater than original background levels or 30 ug/m<sup>3</sup>, whichever is larger, or if at any time visible emissions of lead paint extend out from the Regulated Area, an examination of the Regulated Area shall be conducted and the cause of such emissions corrected. Cleanup of surfaces outside the Regulated Area using HEPA vacuum equipment or wet cleaning techniques shall be done prior to resuming work.
- K. Work outside the initial designated area(s) will not be paid for by the Owner. The Contractor will be responsible for all costs incurred from these activities including repair of any damage.

### 3.2 ESTABLISHMENT OF REGULATED WORK AREAS

- A. The Contractor shall establish a Regulated Area, through the use of appropriate barrier tape, or other means to control unauthorized access into the area when activities impacting lead paint are occurring.

- B. Warning signs meeting the requirements of OSHA 29 CFR 1926.62 shall be posted at all approaches to Regulated Areas. These signs shall read:

WARNING  
LEAD WORK AREA  
POISON  
NO SMOKING OR EATING

- C. The Contractor shall implement appropriate engineering controls such as critical barriers, poly drop cloths, negative pressure, local exhaust ventilation, wet dust suppression methods, etc. as necessary, and as approved by the Owner or Owner's Representative, to prevent the spread of lead contamination beyond the Regulated Area in accordance with the Contractor's approved work plan. Should the previously submitted work plan prove to be insufficient to contain the contamination, the Contractor shall modify its plan and submit it for review by the Owner or Owner's Representative.
- D. For exterior work areas, the Contractor shall use a High Efficiency Particulate Air (HEPA) filtered vacuum dust collection system to remove any visible existing paint chips from the ground to a distance of 20' out from the base of the exterior surface scheduled for lead paint activity prior to commencement of work and extend a 6 mil polyethylene sheet drop cloth on the ground adjacent to the exterior surface scheduled for lead paint activity to contain debris/contamination.

### 3.3 WASH FACILITIES

- A. The Contractor shall provide handwash facilities in compliance with 29 CFR 1926.51(f) and 29 CFR 1926.62 regardless of airborne lead exposure.
- B. If employee exposure to airborne lead exceeds the OSHA Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ), shower rooms must be provided. The Shower Room shall be of sufficient capacity to accommodate the number of workers. One shower stall shall be provided for each eight (8) workers. Showers shall be equipped with hot and cold or warm running water. Shower water shall be collected and filtered using best available technology and disposed of in accordance with all federal, state and local laws, regulations and ordinances.

### 3.4 PERSONNEL PROTECTION

- A. **Exposure Assessments:** The Contractor shall initially determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter ( $30 \mu\text{g}/\text{m}^3$ ). Assessments shall be based on initial air monitoring results as well as other relevant information. The Contractor may rely on historical air monitoring data obtained within the past 12 months under workplace conditions closely resembling the process, type of material, control methods, work practices and environmental conditions used and prevailing in the Contractor's current operations to satisfy the exposure assessment requirements. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.
- B. Until a negative exposure assessment is developed for each task impacting lead paint, the Contractor shall ensure that all workers and authorized person entering the Regulated Area wear protective clothing and respirators in accordance with OSHA 29 CFR 1926.62. Protective clothing shall include impervious coveralls with elastic wrists and ankles, head covering, gloves and foot coverings. Sufficient quantities shall be provided to last throughout the duration of the project.

- C. Protective clothing provided by the Contractor and used during chemical removal operations shall be impervious to caustic materials. Gloves provided by the Contractor and used during chemical removal shall be of neoprene composition with glove extenders.
- D. Respiratory protective equipment shall be provided and selection shall conform to 42 CFR Part 84, 29 CFR Part 1910.134, and 29 CFR Part 1926.62. A formal respiratory protection program must be implemented in accordance with 29 CFR Part 1926.62 and 29 CFR Part 1910.134.

### 3.5 AIR MONITORING REQUIREMENTS

- A. The Contractor shall:
  - 1. Conduct initial exposure monitoring to determine if any employee performing construction tasks impacting lead paint may be exposed to lead at or above the OSHA Action Level of 30 micrograms per cubic meter. Monitoring shall continue as specified in the OSHA standard until a negative exposure assessment is developed.
  - 2. Conduct personnel exposure assessment air sampling, as necessary, to assure that workers are using appropriate respiratory protection in accordance with OSHA Standard 1926.62. Documentation of air sampling results must be recorded at the work site within twenty-four (24) hours and shall be available for review until the job is complete.

### 3.6 LEAD PAINT ACTIVITY PROCEDURES

- A. The Contractor's Competent Person shall be at the job at all times during work impacting lead paint.
- B. Any activity impacting lead painted surfaces shall be performed in a manner which minimizes the spread of lead dust contamination and generation of airborne lead.
- C. The Contractor shall ensure proper entry and exit procedures for workers and authorized persons who enter and leave the Regulated Area. All workers and authorized persons shall leave the Regulated Area and proceed directly to the wash or shower facilities where they will HEPA vacuum gross debris from work suit, remove and dispose of work suit, wash and dry face and hands, and vacuum clothes. Do not remove lead chips or dust by blowing or shaking of clothing. Wash water shall be collected, filtered, and disposed of in accordance with federal, state and local water discharge standards. Any permit required for such discharge shall be the responsibility of the Contractor.
- D. No one shall eat, drink, smoke, chew gum or tobacco, or apply cosmetics while in the Regulated Area.
- E. Utilize appropriate engineering controls and work practices (e.g. wet methods) as directed by 29 CFR 1926.62 (and 40 CFR 745.85 as applicable) to control lead emissions and contamination.
- F. Properly contain wastes containing lead paint for appropriate storage, transport and disposal.
- G. Stop all work in the regulated area and take steps to decontaminate non-work areas and eliminate causes of such contamination should lead contamination be discovered in areas outside of the regulated area.

## H. Special Requirements:

## 1. Demolition/Renovation:

- a. Demolish/renovate in a manner which minimizes the spread of lead contamination and generation of lead dust.
- b. Implement dust suppression controls, such as misters, local exhausts ventilation, etc. to minimize the generation of airborne lead dust.
- c. Segregate work areas from non-work areas through the use of barrier tape, poly criticals, etc.
- d. Clean up immediately after renovation/demolition has been completed

## 2. Chemical Removal:

- a. Apply chemical stripper in quantities and for durations specified by manufacturer.
- b. Where necessary scrape lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use sanding, hand scraping, and dental picks to supplement chemical methods as necessary.
- c. Apply neutralizer compatible with substrate and chemical agent to substrate following removal in accordance with manufacturer's instructions.
- d. Protect adjacent surfaces from damage from chemical removal.
- e. Maintain a portable eyewash station in the work area.
- f. Wear respirators that will protect workers from chemical vapors.
- g. Do not apply caustic agents to aluminum surfaces.
- h. Utilize HEPA filtered local exhaust and ventilation to control chemical paint stripper odors. At no time shall odors be permitted to become a nuisance to building occupants or the public.

## 3. Mechanical Paint Removal:

- a. Provide sanders, grinders, rotary wire brushes, or needle gun removers equipped with a HEPA filtered vacuum dust collection system. Cowling on the dust collection system for orbital-type tools must be capable of maintaining a continuous tight seal with the surface being abated. Cowling on the dust collection system for reciprocating-type tools shall promote an effective vacuum flow of loosened dust and debris. Inflexible cowlings may be used on flat surfaces only. Flexible contoured cowlings are required for curved or irregular surfaces.
- b. Provide HEPA vacuums that are high performance designed to provide maximum static lift and maximum vacuum system flow at the actual operating vacuum condition with the shroud in use. The HEPA vacuum shall be equipped with a pivoting vacuum head.
- c. Remove lead paint from surface down to required level of removal (i.e. stabilized surface, bare substrate with no trace of residual pigment, etc.). Use chemical methods, hand scraping, and dental picks to supplement abrasive removal methods as necessary.
- d. Protect adjacent surfaces from damage from abrasive removal techniques.
- e. Mechanical removal techniques performed on the interior of a building shall be performed within a negative pressure enclosures.



## 4. Component Removal/Replacement:

- a. Wet down components which are to be removed to reduce the amount of dust generated during the removal process.
- b. Remove components utilizing hand tools, and follow appropriate safety procedures during removal. Remove the building components by approved methods which will provide the least disturbance to the substrate material. Do not damage adjacent surfaces.
- c. Clean up immediately after component removals have been completed. Remove any dust located behind the component removed.

## 3.7 PROHIBITED REMOVAL METHODS

- A. The use of heat guns in excess of 700 degrees Fahrenheit to remove lead paint is prohibited.
- B. The use of sand, steel grit, water, air, CO<sub>2</sub>, baking soda, or any other blasting media to remove lead or lead paint without the use of a HEPA ventilated contained negative pressure enclosure is prohibited.
- C. Power tool assisted grinding, sanding, cutting, needle gun, power planing or wire brushing of lead paint without the use of cowled HEPA vacuum dust collection systems is prohibited.
- D. Lead paint burning, busting of rivets painted with lead paint, welding of materials painted with lead paint, and torch cutting of materials painted with lead paint is prohibited. Where cutting, welding, busting, or torch cutting of materials is required, pre-remove the lead paint in the area affected.
- E. Use of chemical strippers containing Methylene Chloride is prohibited. Any chemical stripping may be prohibited on a project by project basis by the Owner or the Owner's Representative
- F. Compressed air shall not be utilized to remove lead paint.
- G. Power/Pressure washing shall not be used to remove paint unless preapproved of by the Owner or the Owner's Representative.

## 3.8 CLEAN-UP AND VISUAL INSPECTION/VERIFICATION

- A. The Contractor shall remove and containerize all lead waste material and visible accumulations of debris, paint chips and associated items.
- B. During clean up the Contractor shall utilize rags and sponges wetted with lead-specific detergent and water as well as HEPA filtered vacuum equipment.
- C. The Contractors Competent Person will conduct a visual inspection of the work areas in order to document that all surfaces have been maintained as free as practicable of accumulations of lead in accordance with OSHA 29 CFR 1926.62(h). If visible accumulations of waste, debris, lead paint chips or dust are found in the work area, the Contractor shall repeat the cleaning, at the Contractor's expense, until the area is in compliance. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate cleanup of the work site.

- D. Where requested by the Owner, the Project Monitor will conduct a visual inspection of the work areas in order to document that all surfaces have been maintained as free as practicable of accumulations of lead in accordance with OSHA 29 CFR 1926.62(h). If visible accumulations of waste, debris, lead paint chips or dust are found in the work area, the Contractor shall repeat the cleaning, at the Contractor's expense, until the area is in compliance. The visual inspection will detect incomplete work, damage caused by the abatement activity, and inadequate clean up of the work site.

### 3.9 POST ABATEMENT WORK AREA DEREGULATION

- A. Following the visual inspection, (and clearance/verification testing if appropriate/specified), any engineering controls and warning signs implemented may be removed.
- B. A final visual inspection of the work area shall be conducted by the Contractors Competent Person and/or the Project Monitor to ensure that all visible accumulations of suspect materials have been removed and that no equipment or materials associated with the abatement project remain. If this final visual is acceptable, the Contractor shall reopen the Regulated Area and remove all signage.
- C. The Contractor shall restore all work areas and auxiliary areas utilized during work to conditions equal to or better than original. Any damage caused during the performance of the work activity shall be repaired by the Contractor at no additional expense to the State.

### 3.10 NON-HAZARDOUS WASTE DISPOSAL/RECYCLING

- A. Non-metallic building debris waste materials tested and found to be non-hazardous Construction and Demolition (C&D) bulk waste shall be disposed of properly at an EPA approved Solid Waste landfill.
- B. Metallic debris shall be segregated and recycled as scrap metal at an approved metal recycling facility. The Contractor shall submit to the Owner and Owner's Representative all documentation necessary to demonstrate the selected recycling facility is able to accept lead-painted scrap metal.
- C. Concrete, brick, stone, cured asphalt, etc. coated with any amount of lead paint cannot be crushed, recycled or buried on-site to minimize waste disposal unless representatively tested and found to meet the EPA and DEP Standards.

### 3.11 HAZARDOUS LEAD WASTE DISPOSAL

- A. Handling, storage, transportation and disposal of hazardous waste materials generated as a result of execution of this project shall comply with all federal, state and local regulations including the EPA RCRA Hazardous Waste Regulations (40 CFR Parts 260-271), the Massachusetts Safety Procedures for Renovation and Occupational Lead Exposure Regulations (454 CMR 22.11 and 23.00), and the DOT Hazardous Materials Regulations (49 CFR Part 171-180).
- B. Hazardous lead waste shall be stored in leak-proof storage containers in the secured storage location. The storage locations shall be reviewed and approved of by the Owner and the Owner's Representative.
- C. The Contractor shall label hazardous waste storage containers with a 6-inch square, yellow, weatherproof, Hazardous Waste sticker in accordance with DOT regulations.

- D. Materials other than direct paint related debris which are incidental to the paint removal work activities (tarps, poly, plywood, PPE, gloves, decontamination materials, etc.) which may be contaminated with lead, shall be stored separately from the direct paint debris, and shall be sampled by the Contractor for waste disposal characterization testing. Such materials characterized as hazardous shall be handled/disposed of as described herein, while materials characterized as non-hazardous shall be disposed of as non-hazardous DEP Solid Waste.
- E. The Owner reserves the right to direct the Project Monitor to observe the sampling or to collect confirmation samples of waste for TCLP analysis.
- F. Project construction waste materials unrelated to lead paint activities shall not be combined/stored with paint debris waste and/or incidental paint removal materials as they are not lead contaminated and shall not be disposed of as hazardous waste. The Owner or Owner's Representative may conduct inspections to verify materials remain segregated.
- G. The Contractor shall obtain and complete all paperwork necessary to arrange for material disposal, including disposal facility waste profile sheets. It is solely the Contractor's responsibility to co-ordinate the disposal of hazardous materials with its selected treatment/recycling/disposal facility(s). Upon receipt of the final approval from the facility, the Contractor shall arrange for the loading, transport and treatment/recycling/disposal of the materials in accordance with all federal and state regulations.
- H. The Contractor shall process the hazardous waste such that the material conforms to the requirements of the selected treatment/disposal facility, including but not limited to specified size and dimension. Refusal on the part of the treatment/disposal facility to accept said material solely on the basis of non-conformance of the material to the facility's physical requirements is the responsibility of the Contractor and no claim for extra work shall be accepted for reprocessing of said materials to meet these requirements.
- I. All DOT shipping documents, including the Uniform Hazardous Waste Manifests utilized to accompany the transportation of the hazardous waste material shall be prepared by the Contractor.
- J. Any spillage of debris during disposal operations during loading, transport and unloading shall be cleaned up in accordance with EPA 40 CFR 265 Subparts C & D, at the Contractor's expense.
- K. The Contractor is liable for any fines, costs or remediation costs incurred as a result of their failure to be in compliance with this Item and all federal, state and local laws.

END OF SECTION 020900

# **ASBESTOS & LEAD PAINT SURVEY REPORT**

## **Fire Alarm System Upgrades**

**United States Postal Service  
25 Dorchester Avenue  
Boston, Massachusetts 02205**

Prepared for:

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USPS Project Number: B19159

**Report Submitted:** February 14, 2017

Prepared By:



**670 N. Commercial Street  
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TRC Project Number: 270953.0000

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### **Appendices**

Appendix A - Inspector Certification

Appendix B - Existing Inspection Documentation

Appendix C – Laboratory Analytical Report

## **1.0 EXECUTIVE SUMMARY**

TRC Environmental Corporation (TRC) conduct a limited asbestos containing building materials (ACM) survey & lead containing paint determination (LCP), including a review of existing inspection documentation, collection of samples, laboratory analysis, and preparation of a report to support the Fire Alarm Upgrades project at 25 Dorchester Avenue, Boston, MA (the “Site”).

The Site building includes two sections. The SPA section is the original building and the section referenced as the SPAA is an addition to the original building.

TRC understands that the proposed renovations will include the removal and replacement of selected fire alarm system components. In general, the existing system will be removed and a new system will be installed.

This survey was limited to the selected building areas and components that were anticipated to be impacted by the proposed renovation project.

ACM identified at the Site that has the potential to be impacted by the proposed project includes: All Floor Tile/Mastic, Plaster on Wire Lath Structural Support Column Enclosures (SPAA – 1<sup>st</sup> Floor West Mechanical Mezzanine and 2<sup>nd</sup> Floor Exterior Walls Associated with the North West Corner) and HVAC Insulation Anchor Mastic.

A review of existing lead paint survey documentation indicated that LCP is associated with paint coated surfaces that are anticipated to be impacted by the proposed project.

## **2.0 INTRODUCTION**

TRC was contracted by the United States Postal Service to conduct a limited ACM and LCP survey, including collection of bulk samples, laboratory analysis, and preparation of a report to support the Fire Alarm Upgrades project at 25 Dorchester Avenue, Boston, MA. The survey was performed on January 11<sup>th</sup> and February 1<sup>st</sup>, 2017 by Mr. Michael McCarter, a Commonwealth of Massachusetts Department of Labor Standards (DLS) certified Asbestos Inspector. A copy of the asbestos inspector’s certifications are included in Appendix A.

TRC understands that the proposed renovations will include the removal and replacement of selected fire alarm components including controls, sensors, alarms/signal devices, and electrical conduit. TRC gained a general understanding of the proposed renovations as indicated on the McKinnell, McKinnell & Taylor Inc. Project Drawings titled “Upgrade Fire Alarm System” dated 12/20/16 and from discussions pertaining to the potential impact of the proposed project on identified ACM.

This survey was limited to the selected building areas and components that were anticipated to be impacted by the proposed renovation project. The survey included the review of existing ACM and LCP survey documentation available at the Site and an inspection and assessment of accessible construction materials anticipated to be impacted by the proposed renovation project. Existing

survey documentation that was available at the Site included the United States Department of Transportation Volpe National Transportation Systems Center Survey. TRC collected confirmation samples from previously identified and unidentified suspect ACM as necessary to categorize selected materials as ACM or non-ACM. A copy of the existing ACM inspection documentation reviewed for this project is contained in Appendix B (Lead paint inspection documentation is extensive and is not included in this report. The lead paint inspection is available at the Site for review).

### **3.0 BACKGROUND**

#### **3.1 Asbestos Containing Materials**

The Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) define an ACM as any material containing more than one percent ( $>1.0\%$ ) asbestos by weight. The Massachusetts Department of Environmental Protection (DEP) defines an ACM as containing one percent or more ( $\geq 1.0\%$ ) asbestos. In addition, ACM are designated by the EPA into one of three characteristic categories as follows:

- Friable asbestos - material which can be crumbled, pulverized or reduced to powder by hand pressure, a.k.a. Regulated Asbestos Containing Materials (RACM)
- Category I Non-friable - includes resilient floor coverings, asphalt roofing products, gaskets and packing. These materials may become friable if degraded or damaged to the point where the material can be crumbled, pulverized or reduced to powder by hand pressure.
- Category II Non-friable - any non-friable ACM that is not in Category I (i.e. Asbestos-cement (Transite) siding, mastics, sealants, etc.).

#### **Asbestos Sampling and Analytical Procedures**

TRC reviewed existing ACM survey documentation and collected confirmation samples from previously identified and unidentified suspect ACM as necessary to categorize homogeneous materials as ACM or non-ACM. Representative bulk samples of suspect ACM were randomly collected from the identified homogeneous building material applications. Homogeneous material determination was based on the following criteria:

- Similar physical characteristics (same appearance, age, color and texture, etc.),
- Application (e.g. sprayed or trowel-on, assembly into a system, etc.),
- Material function (e.g. thermal insulation, floor tile, wallboard system, etc.).

Inspection, sampling and analytical procedures were performed in general accordance with the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 61 Subpart M, the EPA's Asbestos Hazard Emergency Response Act (AHERA) 40 CFR Part 763, the Federal Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101, and the Commonwealth of Massachusetts 310 CMR 7.15 and 453 CMR 6.00 regulations.

The inspector characterized and documented the identified materials by assessing their condition at the time of the survey. Suspect ACM bulk samples were placed into clean air-tight containers, labeled, and shipped to a qualified analytical laboratory under proper chain-of-custody (COC) protocol to an accredited laboratory for polarized light microscopy (PLM) bulk sample analysis.

Laboratory services were provided by TRC in Woburn, Massachusetts. TRC is a National Voluntary Laboratory Accreditation Program (NVLAP) certified laboratory (NVLAP code # 101781-0) and a Massachusetts DLS certified laboratory (certification #AA 000006). A copy of the laboratory analytical report is included in Appendix C.

Bulk samples were analyzed by polarized light microscopy (PLM) utilizing the EPA's Test Methods: Methods for the Determination of Asbestos in Bulk Building Materials (EPA 600/R-93/116 July 1993).

Analysis by PLM was performed by visual observation of the bulk sample and by microscopic analysis using dispersion staining PLM methodology. The samples were analyzed for asbestiform minerals (Chrysotile, Amosite, Crocidolite, Anthophyllite, Actinolite, and Tremolite), fibrous non-asbestos constituents (mineral wool, cellulose, etc.) and non-fibrous constituents. Using a stereoscope, the microscopist visually estimates the relative amounts of each constituent by determining the estimated area of the asbestos compared with the area estimate of the total sample.

### **3.2 Lead Containing Paint**

Regulatory requirements for LCP in non-residential buildings pertain to the disturbance of LCP coated surfaces that have the potential to result in occupational exposure and the disposal of waste generated by disturbance or demolition. Contractors working on LCP are required to comply with the OSHA Lead in Construction Standard 1926.62. This regulation addresses employees performing demolition, construction and maintenance activities who may be occupationally exposed to lead. The standard requires employers to develop a lead compliance program to manage potential and actual exposure to LCP including waste handling and disposal.

Additionally the EPA and DEP may require waste stream classification and sampling to determine disposal requirements for general demolition debris or lead hazardous waste.

## **4.0 FINDINGS**

### **4.1 Asbestos Containing Materials ( $\geq 1\%$ )**

The following materials were identified as containing one percent or more asbestos that will, or may have the potential to be impacted by the proposed project.

<b>Material</b>	<b>Location</b>	<b>Condition</b>	<b>Estimated Quantity</b>
Floor Tiles and Associated Mastics	Throughout	Good	See Note 1



Material	Location	Condition	Estimated Quantity
HVAC Insulation Anchor Pin Mastic (Dark Brown)	AC#2- SPA Basement AC#1- SPA Basement	Good	See Note 2
Plaster Enclosure on Structural Steel Supports	SPAA – 1 <sup>st</sup> Floor West Mechanical Mezzanine and 2 <sup>nd</sup> Floor Exterior Walls Associated With the North West Corner	Good	See Note 3

Note 1 – Floor tiles and associated mastics have been identified as ACM by existing survey documentation. ACM flooring materials may be exposed and concealed under carpeting or multiple layers of floor finish materials. It is anticipated that disturbance may be required where new floor penetrations are needed.

Note 2 – HVAC Insulation Anchor Mastic is associated with some of the HVAC units and associated duct work. It is TRC's understanding that the scope of work for the project is to include removal and replacement of existing HVAC duct smoke detectors in kind and it is not anticipated that this material will be disturbed by the project.

Note 3 – Existing inspection documentation identified this material to be ACM. It is TRC's understanding that the Fire Alarm Upgrades project has been designed to avoid disturbance of this material and it is not anticipated that this material will be directly impacted by the project (i.e. Existing electrical conduit and boxes will remain in place. Existing wiring within conduit and boxes is to be removed without disturbing ACM plaster and new fire alarm system components are not to be attached to the ACM plaster).

#### **4.2 Suspect Materials Identified as Non Asbestos Containing (No Asbestos Detected)**

The following materials were identified as non-ACM that will or have the potential to be impacted by the proposed project.

Material	Location
Spray Applied Fireproofing (Various types and locations)*	Throughout Building
Suspended Ceiling Tiles*	Throughout Building
Gypsum Board*	Throughout Building
Joint Compound*	Throughout Building
Plaster (Not listed in Table 1) - Various types of plasters including base coats and finish coats)*	Throughout Building
HVAC Duct Seam Sealants**	Throughout Building
Fiberglass Duct Insulation Mastic ( Light Tan)**	SPA Basement @ AC#2

Material	Location
Spray Applied Fireproofing (Appeared to have been recently installed on structural steel supports for equipment on 1 <sup>st</sup> floor)**	SPAA Basement @ Column J20
Plaster Finish Coat and Basecoat on Plaster Lath (Enclosures associated with concrete columns)**	SPAA - 2 <sup>nd</sup> Floor - East Side
Plaster Skim Coat On Gypsum Board (Associated with mezzanine structural steel supports)**	SPAA - 2 <sup>nd</sup> Floor - East Side
Plaster Base Coat on Gypsum Board (Associated with mezzanine structural steel supports)**	SPAA - 2 <sup>nd</sup> Floor - East Side
Plaster Base Coat On Wire Lath On Structural Steel Column Enclosure**	SPAA 3 <sup>rd</sup> Floor Mezzanine Mechanical Room

\*= Reported to be non-ACM by existing inspection documentation.

\*\*= Reported to be non-ACM by sampling and analysis performed by TRC for this project. It is noted that TRC performed additional inspection and sampling of plaster materials associated with the East Mezzanine side of the building. This inspection and sampling was performed to confirm that the ACM plaster identified on the West Mezzanine side of the building was not also installed on the East Mezzanine side of the building.

#### **4.3 Lead Containing Paint**

A review of existing lead paint survey documentation indicated that LCP is associated with paint coated surfaces that were anticipated to be impacted by the proposed project.

### **5.0 RECOMMENDATIONS**

TRC recommends that ACM removed and disposed of by a Massachusetts DLS licensed asbestos abatement contractor prior to its disturbance by renovation or maintenance activities.

TRC recommends that work disturbing LCP be performed in accordance with applicable OSHA, EPA and State regulations and requirements.

This inspection was limited to selected building components and areas that were anticipated to be impacted by the proposed project. TRC recommends that this report be provided to the Contractor(s) performing work on the project. Additional ACM or LCP survey documentation may also be available at the Site. TRC recommends that precaution be taken to prevent unauthorized disturbance of ACM and/or LCP identified in this report or previously identified at the Site. All suspect ACM shall be treated as such unless inspection and testing proves otherwise.

As part of the project, TRC recommends the development of a project specifications or work plans and project monitoring to: define project specific requirements; define applicable regulations governing ACM and LCP; provide oversight of contractor activities and air monitoring to verify effectiveness of the Contractors work practices and engineering controls; and perform final

clearance visual inspection and clearance air sampling as required by applicable regulations following an asbestos abatement project.

A copy of this survey report must be maintained by the USPS at the building for review by or submittal to the Massachusetts DEP upon request at all times during related asbestos abatement activities and for a minimum of two years following completion of abatement activities.

## **6.0 DISCLAIMER**

The content presented in this report is based on data collected during the site inspection and survey, review of pertinent regulations, requirements, guidelines and commonly followed industry standards, and information provided (if any) by the property owner, their clients, agents, and representatives.

The work has been conducted in an objective and unbiased manner and in accordance with generally accepted professional practice for this type of work. TRC believes the data and analysis to be accurate and relevant, but cannot accept responsibility for the accuracy or completeness of available documentation or possible withholding of information of other parties. Structures or components thereof surveyed may contain hidden surfaces or materials requiring destructive access to inspect and/or sample. It is possible that additional materials could be discovered during destructive or demolition activities. In the event additional materials (not identified herein) are discovered during such activities, additional investigation and sampling may be necessary.

This survey report is designed to aid the property owner, architect, construction manager, general contractor, and asbestos abatement contractor in locating ACM and LCP. This report is not intended for, and may not be utilized as, a bidding document or as an abatement project specification document.

## **7.0 SIGNATORY**

This survey provided by TRC was conducted by a certified professional, experienced in the inspection and survey for ACM and LCP in building structures and associated components thereof. If there are any questions concerning information contained in this report, you may contact the undersigned in the Manchester, NH office.

Sincerely,  
**TRC Environmental Corporation**



Michael McCarter  
Building Sciences, Senior Project Manager  
MA, DLS, Asbestos Inspector Certification #AI001825

## **Appendix A - Inspector Certification**

**Commonwealth of Massachusetts**  
**Department of Labor Standards**

*William D. McKinney, Director*

**Asbestos Inspector**



**MICHAEL MCCARTER**

Eff. Date 08/17/16

Exp. Date 08/16/17

AI001825

Member of C.O.N.E.S.

HV-R HV-04/29/17

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*This is to certify that*

**Michael L. McCarter**

*has completed the requisite training, and has passed an examination for  
reaccreditation as:*

## Asbestos Inspector Refresher

pursuant to Title II of the Toxic Substance Control Act, 15 U.S.C. 2646

### Course Location

Institute for Environmental Education, Inc.  
16 Upton Drive Wilmington, MA 01887

April 29, 2016

Course Dates

16-0250-106-219102

Certificate Number

April 29, 2016

Examination Date

April 29, 2017

Expiration Date

Training Director

16 Upton Drive, Wilmington, MA 01887

Telephone 978.658.5272

[www.leetrains.com](http://www.leetrains.com)

**INSTITUTE FOR ENVIRONMENTAL EDUCATION**

## **Appendix B - Existing Inspection Documentation**



## 3.3 Summary of Findings

### 3.3.1 Survey Access Limitations

All accessible areas within the facility were inspected for ACBM, including access panels to chases, areas above suspended ceilings, and crawl spaces.

### 3.3.2 Non-Asbestos-Containing Building Materials

The following materials were not sampled (per EPA) because they are not considered suspect asbestos-containing materials:

- Brick materials (except bricks found within boilers)
- Ceramic tiles
- Cinderblock and marble
- Fiberglass insulating materials (yellow and pink colored)
- Plastic and glass materials
- Rubber and synthetic materials including Styrofoam
- Wood materials

The materials classified as non-asbestos-containing materials based on bulk sampling and analytical results are listed in Table 1.

**Table 1**  
**Non-Asbestos-Containing Building Materials**

Material	Reference Sample Numbers
<6" Chilled/Heating Pipe Fitting Insulation	0395-08A, 59A; 0896-103 A, B, C; 0797-04A, B, C, 202A, B, C, 401A, B, C
<6" Chilled/Heating Pipe Saddles	0797-402A
<6" Domestic Water Pipe Fitting Insulation	0395-08B, C; 0797-03A, 03B, 105A, B, C, 206A, B, C
>6" Chilled/Heating Pipe Fitting Insulation	0797-100A, B, C, 101A, B, C, 103A, B, C, 104A, B, C, 106A, C, 109A, B, C, 110A, B, C, 201A, B, C, 307A, B, C
1' X 1' White Ceiling Tile	0395- 161A, B





Material	Reference Sample Numbers
12" X 12" Aqua Floor Tile (Mottled)	0896-79A, B
12" X 12" Beige Floor Tile	0497-155 A, B
12" X 12" Beige Floor Tile (Mottled)	0497-151A, B
12" X 12" Beige Floor Tile (W/Brown Specks)	0896-95A, B
12" X 12" Black Floor Tile (W/White Specks)	0896-42A, B, 61A, B
12" X 12" Black Floor Tile (W/White Streaks)	0896-70A, B
12" X 12" Blue Floor Tile	0395-82B; 0796-12A
12" X 12" Blue Floor Tile (W/White Streaks)	0796-08A, B
12" X 12" Gray Floor Tile (Streaked)	0896-49A, B
12" X 12" Gray Floor Tile (W/Black Specks)	0896-54A, B
12" X 12" Gray Floor Tile (White Mottled)	0395-48A, B; 0896-57A, B
12" X 12" Green Floor Tile	0395-76A, B; 0497-157A
12" X 12" Green Floor Tile (Mottled)	0896-76A, B
12" X 12" Off-white Floor Tile (W/Black Specks)	0395-32A, B
12" X 12" Pink Floor Tile	0395-20A, B; 0896-20C
12" X 12" Plum Floor Tile (Mottled)	0395-38A, B; 0497-153A
12" X 12" White Floor Tile	0395-75A, B, 81A, B; 0896-83A, B
12" X 12" White Floor Tile (B20)	0797-05A, B
12" X 12" White Floor Tile (Mottled)	0896-47A, B
12" X 12" White Floor Tile (W/Gray)	0395-69A, B
12" X 12" White Floor Tile Mastic (B20)	0797-06A, B
2' X 2' White Ceiling Tile	0395-09A, B, 27A, B, 34A, B, 47A, B, 78A, B; 0497-165A, B



Material	Reference Sample Numbers
2' X 4' Brown Ceiling Material (Brown Fibrous)	0896-32A, B
2' X 4' Fissured Ceiling Tile (Shooting Gallery)	0797-502A, B
2' X 4' White Ceiling Tile	0497-164A, B
2' X 4' White Ceiling Tile (Pin Dot Only)	0395-56A, B
2' X 4' White Ceiling Tile (Pocked W/Pin Dot)	0395-13A, B
2' X 4' White Ceiling Tile 2	0395-19A, B, 25A, B, 40A, B, 44A, B
9" X 9" Brown Cork Floor Tile	0896-27A, B
Adhesive On 1' X 1' Ceiling Tile	0797-501A, B
Black Cork Flooring Mastic	0896-31A, B
Black Cove Base	0896-52A, B, 68A, B, 93A, B
Black Floor Tile Mastic (W/12" X 12" Beige)	0497-156A, B
Black Floor Tile Mastic (W/12" X 12" Beige/Brown)	0896-96A, B
Black Floor Tile Mastic (W/12" X 12" Bge Mottled)	0497-152A, B
Black Floor Tile Mastic (W/12" X 12" Black/White)	0896-43A, B, 62A, B, 71A, B
Black Floor Tile Mastic (W/12" X 12" Blue/White)	0395-83A, B; 0796-09A, B, 13A
Black Floor Tile Mastic (W/12" X 12" Gray)	0896-50A, B
Black Floor Tile Mastic (W/12" X 12" Gray/Black)	0896-55A, B



Material	Reference Sample Numbers
Black Floor Tile Mastic (W/12" X 12" Gray/White)	0896-58A, B
Black Floor Tile Mastic (W/12" X 12" Grn Mottled)	0896-77A, B
Black Floor Tile Mastic (W/12" X 12" White)	0395-70A, B, 80A, B; 0896-84A, B; 0497-160A
Black Floor Tile Mastic (W/12" X 12" White/Gray)	0896-48A, B
Black Floor Tile Mastic (W/9" X 9" Brown Cork)	0896-28A, B
Black Gaskets (Air Handler)	0797-102A, B, 204A, B
Black Stair Tread	0896-107A, B
Blue Cove Base	0896-73A, B
Brown Cork Flooring	0896-30A, B
Brown Cove Base	0896-66A, B, 91 A, B
Brown Fire Door Insulation	0896-108A, B
Brown Floor Tile Mastic (W/12" X 12" Aqua Mottled)	0896-80A, B
Brown Trowelled On Beam Plaster	0395-12A, B, C, D, E
Carpet Mastic (W/Blue Carpet)	0896-46A, B, 56A, B, 111A, B
Carpet Mastic (W/Gray Carpet)	0896-72A, B 90A, B
Carpet Mastic (W/Green Carpet)	0896-26A, B, 51A, B
Cove Base Mastic (W/Black Cove Base)	0896-53A, B, 69A, B
Cove Base Mastic (W/Brown Cove Base)	0896-67A, B
Cove Base Mastic (W/Dark Blue Cove Base)	0896-39A, B



Material	Reference Sample Numbers
Cove Base Mastic (W/Gray Cove Base)	0796-15A, B; 0896-37A, B, 60A, B
Cove Base Mastic (W/Large Black Cove Base)	0896-35A, B
Dark Blue Cove Base	0896-38A, B
Exhaust Pipe Insulation	0395-45A, B, C
Gray Cove Base	0796-14A, B; 0896-36A, B, 59A, B, 97A, B, 100A, B
Gray Base Coat	0797-505A, B, C
Gray Spray-On Fire Proofing	0395-22A, B, C, 41A, B, C, D, E, F, G, 42A, B, C, D, E, 50A, B, C, D, E, 63A; 0497-166A, B, C
Gray Trowel-On Fire Proofing	0395-43A, B, C, 64A, B, C; 0797-308A, B, C
Large Black Cove Base	0796-02A, B; 0896-34A, B, 63A, B, 81A, B, 109A, B
Large Navy Cove Base	0796-04A, B
Muffler Exhaust Insulation	0395-46A, B, C
Packing Insulation (Aerator Tank)	0395-07A, B, C
Pipe Insulation Wrap	0896-99A, B, C
Red Fire Brick (Old Incinerator)	0395-04A, B
Red Fire Brick Mortar (Old Incinerator)	0395-05A, B
Sheetrock/Joint Compound (Shooting Gallery)	0797-503A, B
Sheetrock/Joint Compound Composite	0395-23A, B, 25A, B, 26A, B, 61A, B, 162A, B



Material	Reference Sample Numbers
Sheetrock/Joint Compound Composite 3	0395-24A, B, 37A, B, 55A, 67A
Tan Carpet Mastic	0796-20A, B
Tan Carpet Mastic (W/Blue Carpet)	0796-01A, B
Tan Carpet Mastic (W/Gray Carpet)	0796-16A, B; 0896-24A, B
Tan Cove Base Mastic (W/Blue Cove Base)	0896-74A, B
Tan Cove Base Mastic (W/Brown Cove Base)	0896-92A, B
Tan Cove Base Mastic (W/Gray Cove Base)	0896-98A, B, 101A, B
Tan Cove Base Mastic (W/Large Black Cove Base)	0796-03A, B; 0896-64A, B, 82A, B, 110A, B
Tan Cove Base Mastic (W/Large Navy Cove Base)	0796-05A, B
White Column/Ceiling Plaster	0797-01A, B, C, D, E, F, G
Gray Base Coat Column/Ceiling Plaster	0797-02A, B, C, D, E, F, G



Material	Reference Sample Numbers
White Plaster	0395-16A, B, C, D, E, F, G; 0896-29A, B, C, D, E, 104A, B, C, D, E; 0797-108A, 205A, B
White Plaster Skim Coat	0797-504A, B, C
Window Glazing	0896-33A, B
Yellow Fire Brick (Old Boiler)	0395-01A, B
Yellow Fire Brick Mortar (Old Boiler)	0395-02A, B
Yellow Floor Tile Mastic (W/12" X 12" Off-Wht/Blk)	0395-33A, B
Yellow Floor Tile Mastic (W/12" X 12" Pink)	0395-21A, B, C

### 3.3.3 Asbestos-Containing Building Materials

All suspect building materials were sampled and analyzed for asbestos (see Appendix B for ACBM summary tables and laboratory reports).

Because of the limitations of PLM analysis with NOB materials such as floor tile, it is possible that asbestos fibers could be present in floor tile samples, which initially tested negative for asbestos content. For this reason, floor tile and other NOB material samples which initially tested negative for asbestos, were further analyzed by TEM analysis to determine if asbestos was present in the material. TEM analysis was performed by Hygienetics Environmental Laboratory, Incorporated.

For this report, ACBM is classified as either in Good, Fair, or Poor condition. The following are the general definitions of each condition category as well as the definitions of material friability:

- Good Condition: Any material which is intact with no noticeable damage.
- Fair Condition: Any material with a small amount of overall or localized damage (less than 10 percent of the entire area).
- Poor Condition: Any material with a large amount of damage (greater than 10 percent of the entire area).
- Friable Material: Any material which, when dry, may be easily crumbled, pulverized, or reduced to a powder by



hand pressure. It includes previously non-friable material after it becomes damaged to the extent that when dry, it may be crumbled, pulverized, or reduced to a powder by hand pressure.

- **Non-Friable Material:** Any material which, when dry, may not be easily crumbled, pulverized, or reduced to a powder by hand pressure.

The locations, types, quantities, and condition/friability of ACBM and assumed ACBM identified at the facility are listed in Table 2. Tables and drawings which indicate bulk sample summaries, bulk sample locations, and ACBM locations are reported in Appendix B and D respectively.

**Table 2**  
**Asbestos-Containing Building Materials**

**BASEMENT**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	49-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	49-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	52-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	52-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	53-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	53-Inspection Services	Good	160 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	54-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	54-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	55-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	55-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	56-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	56-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	62-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	62-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	63-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	63-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	64-Inspection Services	Good	160 SF	Non-Friable





<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	64-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	65-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	65-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	66-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	66-Inspection Services	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	68-Inspection Services	Good	220 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	68-Inspection Services	Good	220 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	69-Inspection Services	Good	190 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	69-Inspection Services	Good	190 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	70-Inspection Services	Good	320 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	70-Inspection Services	Good	320 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	71-Inspection Services	Good	85 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	71-Inspection Services	Good	85 SF	Non-Friable
Black Vibration Cloth (Assumed Positive)	B1	Good	20 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B10	Good	150 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B10	Good	150 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B10-A	Good	988 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B10-A	Good	988 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B11	Good	1,600 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B11	Good	1,600 SF	Non-Friable
>6" Drain Pipe Insulation	B12	Good	10 LF	Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
9" X 9" Gray Floor Tile (White Mottled)	B12	Good	1,600 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B12	Good	1,600 SF	Non-Friable
9" X 9" Tan Floor Tile (White Mottled)	B15	Good	470 SF	Non-Friable
Black Floor Tile Mastic (W/9" X 9" Tan/White)	B15	Good	470 SF	Non-Friable
9" X 9" Tan Floor Tile (White Mottled)	B16	Good	600 SF	Non-Friable
Black Floor Tile Mastic (W/9" X 9" Tan/White)	B16	Good	600 SF	Non-Friable
9" X 9" Tan Floor Tile (White Mottled)	B17/B19	Good	1,515 SF	Non-Friable
Black Floor Tile Mastic (W/9" X 9" Tan/White)	B17/B19	Good	1,515 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	B18	Good	400 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B18	Good	400 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B18	Good	400 SF	Non-Friable
9" X 9" Tan Floor Tile (White Mottled)	B1A	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/9" X 9" Tan/White)	B1A	Good	100 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B2/3	Good	1,872 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B2/3	Good	1,872 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B20	Good	700 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B20	Good	700 SF	Non-Friable
Gray Vibration Cloth (Assumed Positive)	B20	Good	6 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	B21	Good	550 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	B21	Good	550 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B21	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B21	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B22	Good	250 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B22	Good	250 SF	Non-Friable
Black Vibration Cloth (Assumed Positive)	B22	Good	12 SF	Friable
9" X 9" Tan Floor Tile (White Mottled)	B4A	Good	250 SF	Non-Friable
Black Floor Tile Mastic (W/9" X 9" Tan/White)	B4A	Good	250 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B6	Good	2,340 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B6	Good	2,340 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	B7	Good	250 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B7	Good	250 SF	Non-Friable
<6" Steam Pipe Fitting Insulation	B8	Good	3 EA	Friable
<6" Steam Pipe Insulation	B8	Good	5 LF	Friable
9" X 9" Gray Floor Tile (White Mottled)	B8	Good	988 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	B8	Good	988 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	Back Stairwell To First Floor Mezzanine	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	Back Stairwell To First Floor Mezzanine	Good	150 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Corridor North Of B2 (Through Dble. Door)	Good	500 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
9" X 9" Gray Floor Tile (White Mottled)	Basement Corridor North Of B2 (Through Dble. Door)	Good	500 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Basement Corridor North Of B2 (Through Dble. Door)	Good	500 SF	Non-Friable
>6" Drain Pipe Fitting Insulation	Basement Corridor Section (B2 South To B21)	Good	10 EA	Friable
>6" Drain Pipe Insulation	Basement Corridor Section (B2 South To B21)	Good	10 LF	Friable
9" X 9" Tan Floor Tile (White Mottled)	Basement Corridor Section (B2 South To B21)	Good	3,300 SF	Non-Friable
Black Floor Tile Mastic (W/9" X 9" Tan/White)	Basement Corridor Section (B2 South To B21)	Good	3,300 SF	Non-Friable
>6" Drain Pipe Fitting Insulation	Basement Corridor South (@ Double Door B21)	Good	2 EA	Friable
>6" Drain Pipe Insulation	Basement Corridor South (@ Double Door B21)	Good	15 LF	Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Corridor South (@ Double Door B21)	Good	1,000 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
9" X 9" Gray Floor Tile (White Mottled)	Basement Corridor South (@ Double Door B21)	Good	2,000 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Basement Corridor South (@ Double Door B21)	Good	2,000 SF	Non-Friable
>6" Drain Pipe Insulation	Basement Hallway Outside BM6	Good	20 LF	Friable
>6" Drain Pipe Insulation	Basement Hallway Outside BM8	Good	15 LF	Friable
>6" Drain Pipe Insulation	Basement North Stairwell	Good	20 LF	Friable
9" X 9" Tan Floor Tile (White Mottled)	Basement Storage @ Elevator Chase #4 (B20)	Good	400 SF	Non-Friable
Black Floor Tile Mastic (W/ 9" X 9" Tan/White)	Basement Storage @ Elevator Chase #4 (B20)	Good	400 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Storage 4	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	Basement Storage 4	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Basement Storage 4	Good	350 SF	Non-Friable





<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Storage 5	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	Basement Storage 5	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Basement Storage 5	Good	350 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Storage 6	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	Basement Storage 6	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Basement Storage 6	Good	350 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Storage 7	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	Basement Storage 7	Good	350 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Basement Storage 7	Good	350 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
>6" Drain Pipe Fitting Insulation	BM5 Electrical Room	Good	3 EA	Friable
>6" Drain Pipe Insulation	BM5 Electrical Room	Good	20 LF	Friable
Gray Electrical Insulation (Cloth Wrap) (Assumed Positive)	BM5 Electrical Room	Fair	300 LF	Friable
>6" Drain Pipe Fitting Insulation	BM6	Good	2 EA	Friable
>6" Drain Pipe Insulation	BM6	Good	20 LF	Friable
12" X 12" Blue Floor Tile (Mottled)	BM9	Good	180 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	BM9	Good	180 SF	Non-Friable
Pipe Fitting Insulation	Boiler Room	Good	48 EA	Friable
White Boiler Insulation (Old Boiler)	Boiler Room	Good	5,400 SF	Friable
12" X 12" Red Floor Tile (Mottled)	Break Area At CNS Carrier Unit	Good	30 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Break Area At CNS Carrier Unit	Good	30 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	Break Room #14	Good	865 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Break Room #14	Good	865 SF	Non-Friable
9" X 9" Gray Floor Tile (White Mottled)	Closet Across From Storage 1	Good	600 SF	Non-Friable
9" X 9" Gray Floor Tile Mastic (W/ White Mottled)	Closet Across From Storage 1	Good	600 SF	Non-Friable



**Table 2**  
**Asbestos-Containing Building Materials**

**FIRST FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
1' X 2' Black Asphaltic Floor Planking And Mastic	1008 Men's Locker Room	Good	180 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	1008 Men's Locker Room	Good	216 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	1008 Men's Locker Room	Good	216 SF	Non-Friable
<6" Steam Pipe Insulation	1008 U.S. Customs	Poor	160 LF	Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	1008 U.S. Customs	Good	1,800 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	1008 Women's Locker Room	Good	80 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	1009	Good	65 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	1014 D	Fair	27 SF	Non-Friable
Black Floor Tile Mastic (W/ 12" X 12" Blue Mottled)	1014 D	Fair	27 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Blue Floor Tile (Mottled)	1014C	Good	250 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	1014C	Good	250 SF	Non-Friable
9" X 9" Tan Floor Tile (W/Red And White Streaks)	1M05	Good	800 SF	Non-Friable
Black Floor Tile Mastic (W/Tan W/Red & White)	1M05	Good	800 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Canopy Area	Good	25,000 SF	Non-Friable
Gray Transite Cement Boards	Dock Above Stair 1B	Good	720 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	Elevator Lobby Near Stairwell 2	Good	400 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	Elevator Lobby Near Stairwell 2	Good	400 SF	Non-Friable
Gray Transite Cement Boards	First Floor Battery Room	Good	350 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	First Floor Credit Union	Good	15 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	First Floor Credit Union	Good	15 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (W/Black Streaks)	First Floor Credit Union Break Room	Good	100 SF	Non-Friable
12" X 12" Red Floor Tile Mastic (W/Black Streaks)	First Floor Credit Union Break Room	Good	100 SF	Non-Friable
Yellow Floor Tile Mastic (W/12" X 12" Plum Mott.)	First Floor Credit Union Break Room	Good	150 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	First Floor Financial Unit Vault/Storage Rm.	Good	400 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	First Floor Financial Unit Vault/Storage Rm.	Good	400 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Financial Work Room	Good	950 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	First Floor Mailing Requirements Office	Good	3,200 SF	Non-Friable
12" X 12" Red Floor Tile (W/Black Streaks)	First Floor Mailing Requirements Office	Good	1,840 SF	Non-Friable
12" X 12" Red Floor Tile Mastic (W/Black Streaks)	First Floor Mailing Requirements Office	Good	1,840 SF	Non-Friable
12" X 12" Yellow Floor Tile	First Floor Mailing Requirements Office	Good	3,200 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	First Floor Mailing Requirements Office	Good	3,200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	First Floor Mailing Requirements Office	Good	3,200 SF	Non-Friable
<6" Steam Pipe Fitting Insulation	First Floor Main Entrance Lobby	Good	30 EA	Friable
<6" Steam Pipe Insulation	First Floor Main Entrance Lobby	Good	270 LF	Friable
12" X 12" Blue Floor Tile (Mottled)	First Floor Main Entrance Lobby	Good	670 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	First Floor Main Entrance Lobby	Good	670 SF	Non-Friable
12" X 12" Black Floor Tile	First Floor Mezzanine Hallway	Good	500 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	First Floor Mezzanine Hallway	Good	500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Black)	First Floor Mezzanine Hallway	Good	500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	First Floor Mezzanine Hallway	Good	500 SF	Non-Friable
>6" Drain Pipe Insulation	First Floor Platform Area	Fair	60 LF	Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Platform Area	Fair	14,000 SF	Non-Friable
Gray Transite Cement Boards	First Floor Platform Area	Good	500 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Platform Office Area	Good	600 SF	Non-Friable
Gray Transite Cement Boards	First Floor Storage Area At Elev. 1 & 2	Good	1,700 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Work Room	Good	76,500 SF	Non-Friable
Gray Transite Cement Boards	First Floor Work Room	Good	120 SF	Non-Friable
12" X 12" Black Floor Tile	Hallway At IM05	Good	700 SF	Non-Friable
9" X 9" Tan Floor Tile (W/Red And White Streaks)	Hallway At IM05	Good	700 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Black)	Hallway At IM05	Good	700 SF	Non-Friable
Black Floor Tile Mastic (W/Tan W/Red & White)	Hallway At IM05	Good	700 SF	Non-Friable
12" X 12" Blue Floor Tile (Mottled)	Hallway At Rest Rooms 1005/1006	Good	200 SF	Non-Friable





<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	Hallway At Rest Rooms 1005/1006	Good	200 SF	Non-Friable
>12" Chilled/ Heating Valve Fitting Insulation	M1014 E (Mezz. Mech. Rm.)	Good	10 EA	Friable
>6" Drain Pipe Fitting Insulation	M1014-Postal Police Break Rm.	Good	2 EA	Friable
12" X 12" Red Floor Tile (W/Black Streaks)	M1014-Postal Police Break Rm.	Good	850 SF	Non-Friable
Black Floor Tile Mastic (W/ 12" X 12" Red w/Black Streaks)	M1014-Postal Police Break Rm.	Good	850 SF	Non-Friable
>6" Steam Pipe Insulation	Main Pipe Chase	Good	100 LF	Friable
>6" Drain Pipe Insulation	Postal Police Entrance Hall	Fair	14 LF	Friable
>6" Steam Pipe Insulation	Postal Police Stairwell To Break Rm.	Fair	20 LF	Friable
12" X 12" Blue Floor Tile (Mottled)	Stairwell At 1008	Good	210 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	Stairwell At 1008	Good	210 SF	Non-Friable



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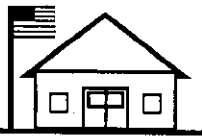
Material Description	Material Location	Material Condition	Material Quantity	Material Friability
>6" Drain Pipe Fitting Insulation	Work Area Outside 1008 Above Ceiling Tile	Good	16 EA	Friable



**Table 2**  
**Asbestos-Containing Building Materials**

**SECOND FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Blue Floor Tile (Mottled)	2000 Supervisor Men's Locker Room	Good	330 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Blue Mottled)	2000 Supervisor Men's Locker Room	Good	330 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2002	Good	450 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2002	Good	450 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003 Administration /Reception	Good	600 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003 Administration /Reception	Good	600 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003B	Good	264 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003B	Good	264 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003C	Good	143 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/Beige Floor Tile)	2003C	Good	143 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003D	Good	234 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003D	Good	234 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003E	Good	120 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003E	Good	120 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003F	Good	208 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003F	Good	208 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003G	Good	156 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003G	Good	156 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003H	Good	156 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003H	Good	156 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
9" X 9" Beige Floor Tile (Under Carpet)	2003I	Good	130 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003I	Good	130 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003J/K	Good	312 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003J/K	Good	312 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003L	Good	312 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003L	Good	312 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003M	Good	300 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003M	Good	300 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003P	Good	300 SF	Non-Friable
Black Floor Tile Mastic (W/Beige Floor Tile)	2003P	Good	300 SF	Non-Friable
9" X 9" Beige Floor Tile (Under Carpet)	2003Q	Good	300 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/Beige Floor Tile)	2003Q	Good	300 SF	Non-Friable
12" X 12" Red Floor Tile (W/Black Streaks)	2004A Women's Locker Room	Good	240 SF	Non-Friable
12" X 12" Red Floor Tile Mastic (W/Black Streaks)	2004A Women's Locker Room	Good	240 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	2006 Break Room	Good	1,370 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	2006 Break Room	Good	1,370 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	2006 Men's Locker Room	Good	5,725 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	2006 Men's Locker Room	Good	5,725 SF	Non-Friable
>6" Drain Pipe Fitting Insulation	2010 Registry Cage	Good	6 EA	Friable
12" X 12" Red Floor Tile (Mottled)	North End Offices/Corridors (2nd Fl)	Good	16,800 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	North End Offices/Corridors (2nd Fl)	Good	16,800 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	Room 2012/2012A	Good	1,470 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Room 2012/2012A	Good	1,470 SF	Non-Friable
>6" Drain Pipe Fitting Insulation	Second Floor Main Corridor	Good	2 EA	Friable



**Table 2**  
**Asbestos-Containing Building Materials**

**THIRD FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
>6" Steam Pipe Insulation	Third Floor Smoke Stack Chase	Good	500 LF	Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Third Floor Customs Area	Good	2,000 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	3006	Good	6,800 SF	Non-Friable
12" X 12" Yellow Floor Tile	3010	Good	500 SF	Non-Friable
12" X 12" Yellow Floor Tile	3010A	Good	500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	3010	Good	500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	3010A	Good	500 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	3013	Good	8,000 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	3013A	Good	1,000 SF	Non-Friable





Material Description	Material Location	Material Condition	Material Quantity	Material Friability
1' X 2' Black Asphaltic Floor Planking And Mastic	3120	Good	2,300 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	3140	Good	2,500 SF	Non-Friable



**Table 2**  
**Asbestos-Containing Building Materials**

**FOURTH FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	4002-A	Good	180 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-A	Good	180 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-B	Good	180 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-B	Good	180 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-C	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-C	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-D	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-D	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-E	Good	150 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-E	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-F	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-F	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-G	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-G	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-H Storage Room	Good	180 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-H Storage Room	Good	180 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-I	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-I	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-J	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-J	Good	150 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile (Mottled)	4002-K	Good	150 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-K	Good	150 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-L Copy Room	Good	120 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-L Copy Room	Good	120 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4002-Reception/Corridor	Good	300 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4002-Reception/Corridor	Good	300 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4003-Office	Good	400 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4003-Office	Good	400 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4003-Reception Area	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4003-Reception Area	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4004-Office	Good	400 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4004-Office	Good	400 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4004-Reception Area	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4004-Reception Area	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4005-A	Good	280 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4005-A	Good	280 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4005-B	Good	280 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4005-B	Good	280 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4005-Central Artery Tunnel Project Coordinator	Good	300 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4005-Central Artery Tunnel Project Coordinator	Good	300 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4005-Corridor	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4005-Corridor	Good	100 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile (Mottled)	4006-Conference Room	Good	1,000 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4006-Conference Room	Good	1,000 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4006-Post Master	Good	1,000 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4006-Post Master	Good	1,000 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4006-Reception Area	Good	1,000 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4006-Reception Area	Good	1,000 SF	Non-Friable
12" X 12" Gray Floor Tile (Mottled)	4006-Storage Space	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Gray Mottled)	4006-Storage Space	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-A	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-A	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-B	Good	160 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-B	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-C	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-C	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-D	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-D	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-E	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-E	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-F Copy Room	Good	140 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-F Copy Room	Good	140 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4007-Reception Area	Good	1,200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4007-Reception Area	Good	1,200 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
1' X 2' Black Asphaltic Floor Planking And Mastic	4009-A	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-A	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-A	Good	200 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4009-B Conference Room	Good	170 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-B Conference Room	Good	170 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-B Conference Room	Good	170 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4009-C	Good	100 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-C	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-C	Good	100 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-D	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-D	Good	100 SF	Non-Friable





Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile (Mottled)	4009-E	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-E	Good	100 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4009-F	Good	100 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-F	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-F	Good	100 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-G	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-G	Good	100 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4009-H	Good	250 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4009-H	Good	250 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-H	Good	250 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4009-Main Lobby	Good	1,200 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	4009-Main Lobby	Good	1,200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4009-Main Lobby	Good	1,200 SF	Non-Friable
Flooring Material (Beneath Red Floor Tile)	4009-Main Lobby	Good	1,200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019 Main Office Area	Good	5,100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019 Main Office Area	Good	5,100 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4019-A	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-A	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-A	Good	200 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4019-B	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-B	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-B	Good	200 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Yellow Floor Tile	4019-C	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-C	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-D	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-D	Good	200 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4019-E	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-E	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-E	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-F	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-F	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-G	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-G	Good	200 SF	Non-Friable



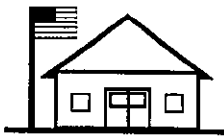
<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
1' X 2' Black Asphaltic Floor Planking And Mastic	4019-H	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-H	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-H	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-I	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-I	Good	200 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4019-J	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-J	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-J	Good	200 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	4019-K	Good	200 SF	Non-Friable
12" X 12" Yellow Floor Tile	4019-K	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	4019-K	Good	200 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	4025 Break Room	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4025 Break Room	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4025-Corridor Area	Good	500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4025-Corridor Area	Good	500 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4025-Inspection Services	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4025-Inspection Services	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026	Good	1,000 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026	Good	1,000 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-13	Good	175 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-13	Good	175 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-14	Good	175 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-14	Good	175 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-15	Good	230 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-15	Good	230 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-16	Good	140 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-16	Good	140 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-17	Good	140 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-17	Good	140 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-18B Storage Room	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-18B Storage Room	Good	100 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-19	Good	170 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-19	Good	170 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	4026-20	Good	170 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-20	Good	170 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-21	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-21	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-22	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-22	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-24	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-24	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-25	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-25	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-26	Good	200 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-26	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-28	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-28	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-29	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-29	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-40-41	Good	1,000 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-40-41	Good	1,000 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-42	Good	380 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-42	Good	380 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-57	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-57	Good	200 SF	Non-Friable





Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile (Mottled)	4026-58	Good	200 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-58	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	4026-70-POAC	Good	110 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	4026-70-POAC	Good	110 SF	Non-Friable
12" X 12" Gray Floor Tile (Mottled)	4032	Good	850 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Gray Mottled)	4032	Good	850 SF	Non-Friable
12" X 12" White Floor Tile (Gray Mottled)	Break Room #20	Good	600 SF	Non-Friable
12" X 12" Gray Floor Tile (Mottled)	Corridor Between 4026-21 & 4026-25	Good	2,500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Gray Mottled)	Corridor Between 4026-21 & 4026-25	Good	2,500 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	Elevator Room-Inspection Services	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Elevator Room-Inspection Services	Good	160 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Red Floor Tile (Mottled)	Fourth Floor East Corridor	Good	1,000 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Fourth Floor East Corridor	Good	1,000 SF	Non-Friable
12" X 12" Yellow Floor Tile	Fourth Floor East Corridor	Good	1,800 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Yellow)	Fourth Floor East Corridor	Good	1,800 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	Fourth Floor West Corridor	Good	700 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Fourth Floor West Corridor	Good	700 SF	Non-Friable
>6" Drain Pipe Fitting Insulation	Fourth Floor Work Area	Good	50 EA	Friable
>6" Drain Pipe Insulation	Fourth Floor Work Area	Fair	50 LF	Friable
>6" Steam Pipe Insulation	Fourth Floor Work Area	Good	55 LF	Friable
12" X 12" Gray Floor Tile (Mottled)	Men's Locker Room 4030	Good	630 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Gray Mottled)	Men's Locker Room 4030	Good	630 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	North End Hallway	Good	500 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile (Mottled)	Office-E	Good	160 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Office-E	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	Office-F	Good	270 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Office-F	Good	270 SF	Non-Friable
12" X 12" Red Floor Tile (Mottled)	Personnel A Office Area	Good	1,100 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Personnel A Office Area	Good	1,100 SF	Non-Friable
12" X 12" Tan Floor Tile (W/Red & White Streaks)	Personnel-Conference Room	Good	100 SF	Non-Friable
Black Floor Tile Mastic (W/Tan W/Red & White)	Personnel-Conference Room	Good	100 SF	Non-Friable
Breeching Insulation	Rooftop Fan Room For Cafeteria	Good	2,100 SF	Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Shooting Range	Good	2,000 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
>6" Steam Pipe Insulation	Smoke Stack Chase (Vertical Riser-All Floors)	Good	1,000 LF	Friable
12" X 12" Red Floor Tile (Mottled)	South End Offices/Corridor (4th Fl-Below Blue/Wht)	Good	18,500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	South End Offices/Corridor (4th Fl-Below Blue/Wht)	Good	18,500 SF	Non-Friable
>6" Steam Pipe Insulation	Stack Room	Good	100 LF	Friable
12" X 12" Red Floor Tile (Mottled)	Supply Room (Adjacent To 4023)	Good	80 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Red Mottled)	Supply Room (Adjacent To 4023)	Good	80 SF	Non-Friable
12" X 12" Gray Floor Tile (Mottled)	Women's Locker Room 4031	Good	500 SF	Non-Friable
Black Floor Tile Mastic (W/12" X 12" Gray Mottled)	Women's Locker Room 4031	Good	500 SF	Non-Friable

The following suspect ACM were not sampled and are assumed to contain asbestos:

- Black Vibration Cloth - B1 - Destructive testing required
- Black Vibration Cloth - B22 - Destructive testing required
- Gray Electrical Insulation (Cloth Wrap) - BM5 Electrical Room - Electrical wire is live
- Gray Vibration Cloth - B20 - Sampling will damage unit



## 3.3 Summary of Findings

### 3.3.1 Survey Access Limitations

All accessible areas within the facility were inspected for ACM, including access panels to chases, areas above suspended ceilings, and crawl spaces.

### 3.3.2 Non-Asbestos-Containing Building Materials

The following materials were not sampled (per EPA) because they are not considered suspect asbestos-containing materials:

- Brick materials (except bricks found within boilers)
- Ceramic tiles
- Cinderblock and marble
- Fiberglass insulating materials (yellow and pink colored)
- Plastic and glass materials
- Rubber and synthetic materials including Styrofoam
- Wood materials

The materials classified as non-asbestos-containing materials based on bulk sampling and analytical results are listed in Table 1.

**Table 1**  
**Non-Asbestos-Containing Building Materials**

Material	Reference Sample Numbers
<6" Domestic Water Pipe Fitting Insulation	0395-104A, 104B, 104C, 137A, 137B, 137C; 0797-1A, 1B
<6" Fire Protection Pipe Ftg. Insul.	0395-102A, 102B, 102C
<6" HW Supply/Return Pipe Ftg. Insul. (To Blowers)	0797-10A, 10B, 10C
<6" Light White Valve Insulation (Insulation On Valve)	0395-118A, 118B, 118C
>24" HW Supply/Return Valve Packing Insulation	0797-12A, 12B, 12C
>6" Chilled/Heating Pipe Fitting Insulation	0797-102A, 102B, 107A, 107 B, 107C, 111A, 111B, 111C, 112A, 112B



Material	Reference Sample Numbers
<6" Chilled/Heating Pipe Fitting Insulation	0395-120A, 120B, 120C; 0797-101A, 101B, 103A, 103B, 103C, 105A, 105B, 105C, 106A, 106B, 106C, 110A, 110B, 110C, 201A, 201B, 201C
>6" Fire Protection Pipe Ftg. Insul.	0797-11A, 11B, 11C
>6" HW Supply/Return Pipe Ftg. Insul. (To Blowers)	0797-9A, 9B, 9C
1' X 2' White Ceiling Tile	0395-157A, 157B
12" X 12" Aqua Floor Tile	0996-117A, 117B, 128A, 128B, 144A, 144B
12" X 12" Black Floor Tile (White Specks)	0996-112A, 112B
12" X 12" Black Floor Tile Mastic (White Specks)	0996-113A, 113B
12" X 12" Blue Floor Tile (White Specks)	0395-107A, 107B; 0597-3A, 3B
12" X 12" Blue Floor Tile Mastic (White Specks)	0395-108A, 108B; 0597-4A, 4B
12" X 12" Brown/Tan Floor Tile	0395-138A, 138B
12" X 12" Brown/Tan Floor Tile Mastic	0395-139A, 139B
12" X 12" Gray Floor Tile (Mottled)	0395-124A, 124B, 165A, 165B; 0896-165C
12" X 12" Gray Floor Tile Mastic (Mottled)	0395-125A, 125B, 166A, 166B; 0896-166C
12" X 12" Tan Floor Tile	0395-155A, 155B; 0996-155C
12" X 12" Green Floor Tile (Mottled)	0996-136A, 136B
12" X 12" Green Floor Tile Mastic (Mottled)	0996-137A, 137B
2' X 2' White Ceiling Tile	0395-95A, 95B, 99A, 99B
2' X 2' White Ceiling Tile (Coarse)	0996-116A, 116B
2' X 2' White Ceiling Tile (Pocked W/Pin Dot)	0395-122A, 122B
2' X 2' White Ceiling Tile (Smooth)	0996-158A, 158B
2' X 4' White Ceiling Tile	0395-111A, 111B



Material	Reference Sample Numbers
2' X 4' White Ceiling Tile (Fissured)	0395-100A, 100B, 147A, 147B
2' X 4' White Ceiling Tile (Pocked W/Pin Dot)	0395-87A, 87B, 90A, 90B, 121A, 121B, 129A, 129B
4" Black Cove Base	0996-123A, 123B, 142A, 142B, 148A, 148B, 156A, 156B
4" Black Cove Base Mastic	0996-124A, 124B, 143A, 143B, 149A, 149B
4" Blue Cove Base	0996-126A, 126B
4" Blue Cove Base Mastic	0996-127A, 127B
4" Brown Cove Base	0996-121A, 121B
4" Brown Cove Base Mastic	0996-122A, 122B
4" Gray Cove Base	0996-119A, 119B, 130A, 130B, 146A, 146B
4" Gray Cove Base Mastic	0996-120A, 120B, 131A, 131B, 147A, 147B
6" Black Cove Base	0996-114A, 114B, 138A, 138B, 150A, 150B, 157A, 157B
6" Black Cove Base Mastic	0996-115A, 115B, 139A, 139B, 151A, 151B,
Black Built Up Roofing (Under Foam Insulation)	0395-150A, 150B, 150C, 150D, 150E, 152A, 152B, 152C
Black Felt Paper (Thin Black)	0395-164A, 164B
Black Roofing Felt Paper (Felt Paper)	0395-149A, 149B, 149C, 149D, 149E
Blue Carpet Mastic	0996-154A, 154B



Material	Reference Sample Numbers
Duct Joiner Cloth	0395-140A, 140B
Gray Carpet Mastic	0996-135A, 135B, 155A, 155B, 160A, 160B
Gray Flex Duct Connector	0797-109A, 109B
Gray Spray-On Fire Proofing	0395-96A, 96B, 96C, 96D, 96E, 96F, 96G, 130A, 130B, 130C, 130D, 130E, 130F, 130G
Green Carpet Mastic	0996-132A, 132B
Pipe Hanger/Saddles (Second Floor Mezz.)	0797-202A
Plaster Base Coat	0996-159A, 159B, 159C, 159D, 159E
Plaster Skim Coat	0395-160A, 160B, 160C, 160D, 160E, 160F, 160G; 0996-133A, 133B, 133C
Sheetrock	0395-114A, 114B, 144C, 115A, 115B, 116A, 116B
Sheetrock/Joint Compound Composite	0395-91A, 91B, 94A, 94B, 112A, 112B, 123A, 123B, 133A, 133B; 0996-134A, 134B
Skim Coat (Over Sheet Rock)	0395-113A, 113B, 113C
Spray-On Fire Proofing	0395-119A, 119B, 119C, 119D, 119E
Trowelled On Cement	0395-159A, 159B, 159C
Trowelled On Fireproofing	0395-103A, 103B, 103C
Vibration Collar/Duct Connector	0996-140A, 140B
White Textured Ceiling Material	0395-106A, 106B, 106C, 106D, 106E

### 3.3.3 Asbestos-Containing Building Materials

All suspect building materials were sampled and analyzed for asbestos (see Appendix B for ACBM summary tables and laboratory reports).

Because of the limitations of PLM analysis with NOB materials such as floor tile, it is possible that asbestos fibers could be present in floor tile samples, which initially tested negative for asbestos content. For this reason, floor tile and other NOB material samples which initially tested negative for asbestos, were further analyzed by TEM analysis to determine if asbestos was present in the material. TEM analysis was performed by Hygienetics Environmental Laboratory, Inc.





For this report, ACBM is classified as either in Good, Fair, or Poor condition. The following are the general definitions of each condition category as well as the definitions of material friability:

- **Good Condition:** Any material which is intact with no noticeable damage.
- **Fair Condition:** Any material with a small amount of overall or localized damage (less than 10 percent of the entire area).
- **Poor Condition:** Any material with a large amount of damage (greater than 10 percent of the entire area).
- **Friable Material:** Any material which, when dry, may be easily crumbled, pulverized, or reduced to a powder by hand pressure. It includes previously non-friable material after it becomes damaged to the extent that when dry, it may be crumbled, pulverized, or reduced to a powder by hand pressure.
- **Non-Friable Material:** Any material which, when dry, may not be easily crumbled, pulverized, or reduced to a powder by hand pressure.

The locations, types, quantities, and condition/friability of ACBM and assumed ACBM identified at the facility are listed in Table 2. Tables and drawings which indicate bulk sample summaries, bulk sample locations, and ACBM locations are reported in Appendix B and D respectively.

**Table 2**  
**Asbestos-Containing Building Materials**

**BASEMENT**

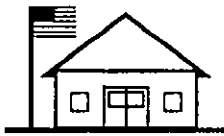
<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" White Floor Tile (Mottled)	B25	Good	275 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile Mastic (Mottled)	B25	Good	275 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B27	Good	260 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B27	Good	260 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B27A Training	Good	520 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B27A Training	Good	520 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B28	Good	360 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B28	Good	360 SF	Non-Friable
<6" CW/HW Pipe Fitting Insulation (B30 Mech. Rm.)	B30	Fair	23 EA	Friable
<6" Lo/Med Steam Pipe Ftg. Insul. (B30 Mech. Rm.)	B30	Good	12 EA	Friable
>24" Condensate Return Tank Insulation	B30	Good	15 SF	Friable
>6" CW/HW Pipe Ftg. Insul. (Basement)	B30	Fair	59 EA	Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile (Mottled)	B30A	Good	160 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B30A	Good	160 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B30B	Good	160 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B30B	Good	160 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B31	Good	450 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B31	Good	450 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B32	Good	280 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B32	Good	280 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	B33	Good	650 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B33	Good	650 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B33	Good	650 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile (Mottled)	B34	Good	95 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B34	Good	95 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B36	Good	160 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B36	Good	160 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B38	Good	160 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B38	Good	160 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B39	Good	160 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B39	Good	160 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B41	Good	500 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B41	Good	500 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B41 Conference Room	Good	350 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile Mastic (Mottled)	B41 Conference Room	Good	350 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B42	Good	680 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B42	Good	680 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B42A	Good	120 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B42A	Good	120 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B42B	Good	120 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B42B	Good	120 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B43 Hall	Good	168 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B43 Hall	Good	168 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B43A	Good	210 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B43A	Good	210 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile (Mottled)	B43B	Good	210 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B43B	Good	210 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B43C	Good	580 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B43C	Good	580 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B43D	Good	75 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B43D	Good	75 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B44 Men's Locker Room	Good	3,000 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	B44 Men's Locker Room	Good	3,000 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	B45	Good	4,600 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	B45A	Good	200 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	B48 Supervisor's Locker Room	Good	160 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile Mastic (Mottled)	B48 Supervisor's Locker Room	Good	160 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	B50	Good	1,200 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	B51	Good	775 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 1	Good	1,920 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 1	Good	1,920 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 2	Good	600 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 2	Good	600 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 3	Good	1,175 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 3	Good	1,175 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 4	Good	1,400 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 4	Good	1,400 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 5	Good	1,830 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 5	Good	1,830 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 6	Good	3,700 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 6	Good	3,700 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Basement Hallway Section 7	Good	3,700 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Basement Hallway Section 7	Good	3,700 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Basement Hallway Section 7	Good	3,700 SF	Non-Friable
>6" Chilled/Heating Pipe Hanger Insulation	Basement Storage Room 1	Good	32 EA	Friable
>6" CW/HW Pipe Ftg. Insul. (Basement)	Basement Storage Room 1	Good	7 EA	Friable
>6" CW/HW Pipe Ftg. Insul. (Basement)	Parking Garage	Good	12 EA	Friable
12" X 12" White Floor Tile (Mottled)	Women's Locker Room	Good	300 SF	Non-Friable





Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile Mastic (Mottled)	Women's Locker Room	Good	300 SF	Non-Friable



**Table 2**  
**Asbestos-Containing Building Materials**

**FIRST FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
1' X 2' Black Asphaltic Floor Planking And Mastic	Amtrak Unloading Area	Good	4,275 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Break Room #10 (First Floor Mezz.)	Good	1,400 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Break Room #4 (First Floor)	Good	1,270 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Break Room #5 (First Floor)	Good	180 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Break Room #6 (First Floor)	Good	440 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Break Room #7 (First Floor)	Good	440 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Break Room #8 (First Floor)	Good	300 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Break Room #8 (First Floor)	Good	300 SF	Non-Friable
12" X 12" Beige Floor Tile (W/Brown)	Escalator Landings	Good	450 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (W/Brown)	Escalator Landings	Good	450 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Gray Transite Cement Boards	First Floor Inspector's Gallery	Good	58,000 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Main Work Room	Good	196,000 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	First Floor Maintenance Cage	Good	325 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	First Floor Maintenance Cage	Good	325 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Work Room #1	Good	40,000 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	First Floor Work Room #2	Good	22,000 SF	Non-Friable
Gray Transite Cement Boards	First Floor Work Room #2 (Inspector's Gallery)	Good	3,000 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Hallway To Break Room #10	Good	710 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Loading Dock	Good	56,000 SF	Non-Friable
Brown Flex Connector Cloth (Assumed Positive)	M101	Fair	20 SF	Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile (Mottled)	M106	Good	160 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	M106	Good	160 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	M107	Good	150 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	M107	Good	150 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	M108	Good	625 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	M108	Good	625 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	M112 Men's Locker Room	Good	650 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	M112 Men's Locker Room	Good	650 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	M115 Men's Locker Room	Good	3,200 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	M115 Men's Locker Room	Good	3,200 SF	Non-Friable
Beige Flex Connector/Vibration Cloth (Assumed Positive)	M119 Mechanical Room	Good	15 SF	Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
>6" White Emergency Generator Exhaust	Mechanical Mezzanine (First Floor)	Good	30 LF	Friable
Brown Flex Connector Cloth (Assumed Positive)	Mechanical Mezzanine (First Floor)	Fair	50 SF	Friable
Plaster On Column	Mechanical Mezzanine (First Floor)	Good	2,000 SF	Friable
12" X 12" White Floor Tile (Mottled)	Office 1021	Good	400 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Office 1021	Good	400 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	Office Area In Center Of Platform Area	Good	1,400 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	Office Area In Center Of Platform Area	Good	1,400 SF	Non-Friable



**Table 2**  
**Asbestos-Containing Building Materials**

**SECOND FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Beige Floor Tile (Mottled)	2002	Good	675 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2002	Good	675 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	2018 Copy Room	Good	65 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	2018 Copy Room	Good	65 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2018 Mechanical Room	Good	160 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2018 Mechanical Room	Good	160 SF	Non-Friable
12" X 12" Red Floor Tile	2018 Mechanical Room	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2018 Mechanical Room	Good	50 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	2018 Supply Room	Good	120 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	2019	Good	200 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
1' X 2' Black Asphaltic Floor Planking And Mastic	2019A	Good	180 SF	Non-Friable
12" X 12" Red Floor Tile	2020	Good	75 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2020	Good	75 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	2020	Good	220 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	2020	Good	220 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	2024	Good	390 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2024	Good	390 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2024	Good	390 SF	Non-Friable
12" X 12" Red Floor Tile	2024	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2024	Good	50 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2024A	Good	390 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2024A	Good	390 SF	Non-Friable



<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
12" X 12" Beige Floor Tile (Mottled)	2024B	Good	200 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2024B	Good	200 SF	Non-Friable
12" X 12" Red Floor Tile	2024B	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2024B	Good	50 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2027	Good	50 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2027	Good	50 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2028 Closet	Good	50 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2028 Closet	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile	2028 Closet	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2028 Closet	Good	50 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2028A	Good	400 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2028A	Good	400 SF	Non-Friable
12" X 12" Red Floor Tile	2028A	Good	45 SF	Non-Friable

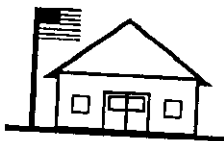




Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile Mastic	2028A	Good	45 SF	Non-Friable
12" X 12" Red Floor Tile	2029 Computer Room	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2029 Computer Room	Good	50 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	2029A Computer Room	Good	200 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2029A Computer Room	Good	200 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2029A Computer Room	Good	200 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	2029B Computer Room	Good	200 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2029B Computer Room	Good	200 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2029B Computer Room	Good	200 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2030	Good	510 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2030	Good	510 SF	Non-Friable
12" X 12" Red Floor Tile	2030	Good	510 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile Mastic	2030	Good	510 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2031	Good	520 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2031	Good	520 SF	Non-Friable
12" X 12" Red Floor Tile	2031	Good	520 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2031	Good	520 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	2031	Good	520 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	2031	Good	520 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	2032	Good	520 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	2032	Good	520 SF	Non-Friable
12" X 12" Red Floor Tile	2032	Good	50 SF	Non-Friable
12" X 12" Red Floor Tile Mastic	2032	Good	50 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	2032	Good	520 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" White Floor Tile Mastic (Mottled)	2032	Good	520 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Break Room #11	Good	510 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Break Room #11	Good	510 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	Break Room #11 (Second Floor)	Good	510 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	Break Room #11 (Second Floor)	Good	510 SF	Non-Friable
12" X 12" Aqua Floor Tile Mastic	Break Room #13	Good	800 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	Corridor From M210B To South End	Good	2,170 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	Corridor From M210B To South End	Good	2,170 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	Corridor From M212-M210B	Good	800 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	Corridor From M212-M210B	Good	800 SF	Non-Friable
12" X 12" Beige Floor Tile (W/Brown)	Corridor From M217-M220	Good	450 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Beige Floor Tile Mastic (W/Brown)	Corridor From M217-M220	Good	450 SF	Non-Friable
12" X 12" Beige Floor Tile (W/Brown)	Corridor From M231-M220	Good	880 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (W/Brown)	Corridor From M231-M220	Good	880 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Hallway Area Near 2015	Good	2,000 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	Lobby Outside Women's Room	Good	150 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	Lobby Outside Women's Room	Good	150 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M201	Good	1,200 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M201	Good	1,200 SF	Non-Friable
Beige Flex Connector/Vibration Cloth (Assumed Positive)	M203 Mechanical Room	Good	6 SF	Friable
12" X 12" Beige Floor Tile (Mottled)	M204	Good	1,000 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Beige Floor Tile Mastic (Mottled)	M204	Good	1,000 SF	Non-Friable
12" X 12" Beige Floor Tile (W/Brown)	M207	Good	1,585 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (W/Brown)	M207	Good	1,585 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M210	Good	400 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M210	Good	400 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M210B	Good	220 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M210B	Good	220 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M210C	Good	320 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M210C	Good	320 SF	Non-Friable
Maroon Carpet Mastic	M210C	Good	320 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M212/214	Good	4,300 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Beige Floor Tile Mastic (Mottled)	M212/214	Good	4,300 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M217	Good	700 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M217	Good	700 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M218	Good	2,200 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M218	Good	2,200 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M220	Good	1,000 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M220	Good	1,000 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M220A	Good	800 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M220A	Good	800 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	M229 Inspector Break Room	Good	140 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M229 Inspector Break Room	Good	140 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Beige Floor Tile (Mottled)	M231 Supervisor Lounge	Good	560 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	M231 Supervisor Lounge	Good	560 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Maintenance Cage	Good	325 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Maintenance Cage	Good	325 SF	Non-Friable
12" X 12" Beige Floor Tile (Mottled)	Men's Locker Room	Good	2,160 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (Mottled)	Men's Locker Room	Good	2,160 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Second Floor Corridor	Good	75,000 SF	Non-Friable
Gray Transite Cement Boards	Second Floor Inspector's Gallery	Good	100,000 SF	Non-Friable
Medium Dark Gray Skim Coat (Trowelled On Mortar)	Second Floor Main Work Area	Good	2,000 SF	Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Second Floor Supervisors Office (Main Floor)	Good	140 SF	Non-Friable
12" X 12" Red Floor Tile	Second Floor Women's Bathroom Hall	Good	50 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
12" X 12" Red Floor Tile Mastic	Second Floor Women's Bathroom Hall	Good	50 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	Second Floor Work Area	Good	180,000 SF	Non-Friable





**Table 2**  
**Asbestos-Containing Building Materials**

**THIRD FLOOR**

<b>Material Description</b>	<b>Material Location</b>	<b>Material Condition</b>	<b>Material Quantity</b>	<b>Material Friability</b>
9" X 9" Tan Floor Tile	3022	Good	380 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	3022	Good	380 SF	Non-Friable
9" X 9" Tan Floor Tile	314	Good	140 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	314	Good	140 SF	Non-Friable
9" X 9" Tan Floor Tile	315	Good	120 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	315	Good	120 SF	Non-Friable
9" X 9" Tan Floor Tile	316	Good	70 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	316	Good	70 SF	Non-Friable
9" X 9" Tan Floor Tile	318	Good	200 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	318	Good	200 SF	Non-Friable
9" X 9" Tan Floor Tile	319	Good	200 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	319	Good	200 SF	Non-Friable
9" X 9" Tan Floor Tile	340	Good	80 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
9" X 9" Tan Floor Tile Mastic	340	Good	80 SF	Non-Friable
9" X 9" Tan Floor Tile	Cafeteria	Good	10,600 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Cafeteria	Good	10,600 SF	Non-Friable
Black Flashing (Roof Flashing Sealant)	Cafeteria Fan Room SPAA Roof	Good	1,000 SF	Non-Friable
9" X 9" Tan Floor Tile	Clinic	Good	320 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Clinic	Good	320 SF	Non-Friable
9" X 9" Tan Floor Tile	Credit Union	Good	2,700 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Credit Union	Good	2,700 SF	Non-Friable
12" X 12" Beige Floor Tile (W/Brown)	Escalator Landings	Good	450 SF	Non-Friable
12" X 12" Beige Floor Tile Mastic (W/Brown)	Escalator Landings	Good	450 SF	Non-Friable
Beige Flex Connector/Vibration Cloth (Assumed Positive)	Escalator Landings	Good	5 SF	Friable
9" X 9" Tan Floor Tile	Hallway Area Of Medical Unit	Good	2,500 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Hallway Area Of Medical Unit	Good	2,500 SF	Non-Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
9" X 9" Tan Floor Tile	Hallway Out Side Room 3021	Good	2,500 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Hallway Out Side Room 3021	Good	2,500 SF	Non-Friable
12" X 12" White Floor Tile (Mottled)	Hallway Outside Room 3021	Good	200 SF	Non-Friable
12" X 12" White Floor Tile Mastic (Mottled)	Hallway Outside Room 3021	Good	200 SF	Non-Friable
9" X 9" Tan Floor Tile	Hallway Section 1 From The Cafeteria To Room 3019	Good	2,800 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Hallway Section 1 From The Cafeteria To Room 3019	Good	2,800 SF	Non-Friable
1' X 2' Black Asphaltic Floor Planking And Mastic	JMPE Mechanical Room	Good	4,050 SF	Non-Friable
9" X 9" Tan Floor Tile	Kitchen Offices	Good	300 SF	Non-Friable
9" X 9" Tan Floor Tile Mastic	Kitchen Offices	Good	300 SF	Non-Friable
Black Flashing (Roof Flashing Sealant)	Roof	Good	3,500 SF	Non-Friable
White Pipe Insulation (Exhaust Pipe Insulation)	Roof	Good	250 LF	Friable



Material Description	Material Location	Material Condition	Material Quantity	Material Friability
Black Flex Connector For HVAC Units (Assumed Positive)	Rooftop Fan Room For Cafeteria	Fair	5 SF	Friable
Breeching Insulation	Rooftop Fan Room For Cafeteria	Good	2,100 SF	Friable
White Pipe Insulation (Exhaust Pipe Insulation)	Rooftop Fan Room For Cafeteria	Fair	1,000 LF	Friable
12" X 12" Tan Floor Tile Mastic	Third Floor Hallway Section 3	Good	2,100 SF	Non-Friable

The following suspect ACBM were not sampled and are assumed to contain asbestos:

- Beige Flex Connector/Vibration Cloth - Escalator Landings - Material not tested/operational system
- Beige Flex Connector/Vibration Cloth - M119 Mechanical Room - Material not tested/operational system
- Beige Flex Connector/Vibration Cloth - M203 Mechanical Room - Material not tested/operational system
- Black Flex Connector For HVAC Units - Rooftop Fan Room For Cafeteria - Material not tested/operational system
- Brown Flex Connector Cloth - M101 - Material Not Tested/operational system
- Brown Flex Connector Cloth - Mechanical Mezzanine - Material Not Tested/operational system
- White Cloth Flex Connector For HVAC Unit - M232 - Material Not Tested/operational system

### 3.4 Conclusion/Recommendations

An operations and maintenance (O&M) program will be developed by the Volpe Center/ETC Team specifically for the positively identified ACBM at the Boston SPAA. Any renovation/demolition work which may impact these positive materials should be conducted in accordance with the O&M program and all applicable

## **Appendix C - Laboratory Analytical Report**

CLIENT: USPS  
345 HERITAGE AVENUE  
PORTSMOUTH, NH 03801

LOCATION: FIRE ALARM UPGRADES  
25 DORCHESTER AVENUE  
BOSTON, MASSACHUSETTS

PROJECT: 270953 - 545848  
DATE RECEIVED: 01/17/17  
ANALYZED: 01/19/17  
COLLECTED BY: TRC  
COLLECTED: 01/11/17

### ANALYTICAL RESULTS OF BULK SAMPLES

LAB ID	SAMPLE DESCRIPTION	COLOR LAYERED	ANALYTICAL RESULTS
545848	FIELD ID: 01A MATERIAL: FIBERGLASS DUCT INSULATION MASTIC (TAN) LOCATION: SPA-BASEMENT AC-2 (COLUMN K7.5)	TN N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %
545849	FIELD ID: 01B MATERIAL: FIBERGLASS DUCT INSULATION MASTIC (TAN) LOCATION: SPA-BASEMENT AC-2 (COLUMN K7.5)	TN N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %
545850	FIELD ID: 02A MATERIAL: FIBERGLASS DUCT INSULATION PIN MASTIC (DARK BROWN) LOCATION: SPA-BASEMENT AC-2 (COLUMN K7.5)	BR N	ASBESTOS - CHRYSOTILE 15 % NONFIBROUS MATERIAL 85 %
545851	FIELD ID: 02B MATERIAL: FIBERGLASS DUCT INSULATION PIN MASTIC (DARK BROWN) LOCATION: SPA-BASEMENT AC-2 (COLUMN K7.5)	N/A N/A	SAMPLE NOT ANALYZED
545852	FIELD ID: 03A MATERIAL: FIBERGLASS DUCT INSULATION PIN MASTIC (DARK BROWN) LOCATION: SPA-BASEMENT AC-2 (COLUMN D21)	BR N	ASBESTOS - CHRYSOTILE 15 % NONFIBROUS MATERIAL 85 %
545853	FIELD ID: 03B MATERIAL: FIBERGLASS DUCT INSULATION PIN MASTIC (DARK BROWN) LOCATION: SPA-BASEMENT AC-2 (COLUMN D21)	N/A N/A	SAMPLE NOT ANALYZED
545854	FIELD ID: 04A MATERIAL: GRAY HVAC SEAM SEALANT LOCATION: SPAA-FIRST FLOOR AT RTU-1 (COLUMN B-11)	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %

LAB ID	SAMPLE DESCRIPTION	COLOR LAYERED	ANALYTICAL RESULTS
545855	FIELD ID: 04B	GY	NO ASBESTOS DETECTED
	MATERIAL: GRAY HVAC SEAM SEALANT	N	NONFIBROUS MATERIAL 100 %
	LOCATION: SPAA-FIRST FLOOR AT AC-7 (COLUMN A-4)		



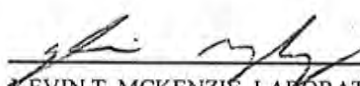
NOTES: N/A=NOT APPLICABLE

COLOR CODES:	BG BEIGE	BR BROWN	GY GRAY	OR ORANGE	RD RED	WH WHITE	GD GOLD
	BK BLACK	CL CLEAR	MU MULTI	PI PINK	SI SILVER	YL YELLOW	
	BL BLUE	GN GREEN	N/A NONE	PR PURPLE	TN TAN	MA MAROON	

LABORATORY CERTIFICATIONS: MA #AA000006 RI #AAL-129 ME #LB-0071 CT #PH-0248

ACCREDITATION: NVLAP #101781-0

DATE OF ISSUE: 01/20/17

APPROVED SIGNATORY:  KEVIN T. MCKENZIE, LABORATORY MANAGER

THESE SAMPLES WERE ANALYZED BY POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING (PLM/DS) ACCORDING TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) "INTERIM METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK INSULATION SAMPLES" (EPA-600/M4-82-020) AND "METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK BUILDING MATERIALS" (EPA-600/R93/116). THESE METHODS ARE CONSIDERED SENSITIVE TO THE PRESENCE OF ASBESTOS AT LESS THAN ONE PERCENT.

THIS REPORT RELATES ONLY TO THOSE SAMPLES ANALYZED, AND MAY NOT BE INDICATIVE OF OTHER SIMILAR APPEARING MATERIALS EXISTING AT THIS, OR OTHER SITES.

FLOOR TILES AND RESINOUSLY BOUND MATERIALS ANALYZED BY EPA METHOD 600/R93/116, "METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK BUILDING MATERIALS," MAY YIELD FALSE NEGATIVE RESULTS DUE TO DIFFICULTIES IN ISOLATING SUSPECT FIBERS AND SUBSEQUENTLY IDENTIFYING THEM BENEATH THE MATRIX MATERIAL WHICH ENCAPSULATES THEM.

THE EPA REQUIRES THAT FRIABLE SAMPLES WITH ASBESTOS CONTENTS OF LESS THAN 10%, DETERMINED BY A VISUAL ESTIMATION, BE VERIFIED USING THE POINT COUNTING TECHNIQUE OR OTHERWISE BE ASSUMED TO CONTAIN GREATER THAN 1% ASBESTOS BY THE BUILDING OWNER OR OPERATOR. IF ANALYTICAL RESULTS INDICATE THE PRESENCE OF 1% OR LESS ASBESTOS IN A FRIABLE MATERIAL, THAT MATERIAL MUST BE TREATED AS ASBESTOS-CONTAINING MATERIAL UNLESS THESE QUANTITIES ARE VERIFIED USING THE POINT COUNTING TECHNIQUE. FRIABLE SAMPLES WILL BE POINT-COUNTED UPON REQUEST BY THE CLIENT. POINT COUNTING IS NOT REQUIRED FOR THOSE SAMPLES IN WHICH NO ASBESTOS IS DETECTED DURING ANALYSIS BY PLM.

ALL SAMPLES ARE STORED AT THE TRC LABORATORY FOR A PERIOD OF THREE MONTHS. FURTHER ANALYSIS OR RETURN OF SAMPLES MUST BE REQUESTED WITHIN THIS THREE-MONTH PERIOD TO GUARANTEE THEIR AVAILABILITY.

THIS REPORT MAY NOT BE REPRODUCED EXCEPT IN ITS ENTIRETY, WITHOUT PERMISSION OF THE TRC ENVIRONMENTAL LABORATORY DIRECTOR OR ONE OF THE LABORATORY SIGNATORIES. THIS REPORT MAY NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL GOVERNMENT.



Asbestos Bulk Chain of Custody

TRC Project No. 276953.0000		Client: USFS		Turnaround (circle) same day 24-hr standard (5 day)							
Samples Collected by: Michael McCarter		Project Name: Fire Alarm Upgrade		Contact: Michael McCarter							
License # AI 001825		and Location: 25 Dorchester Ave Boston MA		Phone 603-396-2600							
Date(s) Collected: 1/11/19				Fax: Email mmccarter@trcsolutions.com							
Sample ID	DO NOT WRITE IN SHADED AREAS	Stereoscopic Visual	Optical Properties	Fiber Ref. Ind.	% Asbestos Fiber Present	% Non Asbestos Present					
Field ID #	DESCRIPTION	C % A % I % O % b % r %	T % H % M % E % S % B % P % O %		C % A % C % T % A % A %	Fibrous Glass	Cellulose	Hair	Synthetic	Other	Non Fibrous
01A	MATERIAL: Fiberglass Duct Insulation LOCATION: Mast (Tan) SPA - Basement AC-2 (column K-7.5)										100
545848											100
03	MATERIAL: Fiberglass Duct Insulation LOCATION: Mast (Tan) SPA - Basement AC-2 (column K-7.5)										100
545849											100
02A	MATERIAL: Fiberglass Duct Insulation LOCATION: Mast (Dark Brown) SPA - Basement AC-2 (column K-7.5)										85
545850											85
02B	MATERIAL: Fiberglass Duct Insulation LOCATION: Mast (Dark Brown) SPA - Basement AC-2 (column K-7.5)										85
545851											85
03A	MATERIAL: Fiberglass Duct Insulation LOCATION: Mast (Dark Brown) SPA - Basement AC-2 (column K-7.5)										85
545852											85
03B	MATERIAL: Fiberglass Duct Insulation LOCATION: Mast (Dark Brown) SPA - Basement AC-2 (column K-7.5)										85
545853											85

Relinquished by: [Signature] Date: 1/11/19 Received by: [Signature] Date: 1-17-19

Accept ☒ Reject ☐ Comments: [Signature] Analyst's Signature: [Signature] Date(s) Analyzed: 1/19/19 Temp: [Signature]

Rev. 08/26/14



CLIENT: UNITED STATES POSTAL SERVICE - NH  
345 HERITAGE AVENUE  
PORTSMOUTH, NH 03801

LOCATION: FIRE ALARM SYSTEM  
25 DORCHESTER AVENUE  
BOSTON, MASSACHUSETTS

PROJECT: 270953.0001 - 547811  
DATE RECEIVED: 02/02/17  
ANALYZED: 02/06/17  
COLLECTED BY: TRC  
COLLECTED: 02/01/17

### ANALYTICAL RESULTS OF BULK SAMPLES

LAB ID	SAMPLE DESCRIPTION	COLOR LAYERED	ANALYTICAL RESULTS
547811	FIELD ID: 01A MATERIAL: SPRAY-ON FIREPROOFING ON STRUCTURAL STEEL, APPEARED TO BE RECENTLY INSTALLED CONSTRUCTION LOCATION: BASEMENT, AT COLUMN J20	GY N	NO ASBESTOS DETECTED MINERAL WOOL 85 % NONFIBROUS MATERIAL 15 %
547812	FIELD ID: 01B MATERIAL: SPRAY-ON FIREPROOFING ON STRUCTURAL STEEL, APPEARED TO BE RECENTLY INSTALLED CONSTRUCTION LOCATION: BASEMENT, AT COLUMN J20	GY N	NO ASBESTOS DETECTED MINERAL WOOL 85 % NONFIBROUS MATERIAL 15 %
547813	FIELD ID: 01C MATERIAL: SPRAY-ON FIREPROOFING ON STRUCTURAL STEEL, APPEARED TO BE RECENTLY INSTALLED CONSTRUCTION LOCATION: BASEMENT, AT COLUMN J20	GY N	NO ASBESTOS DETECTED MINERAL WOOL 85 % NONFIBROUS MATERIAL 15 %
547814	FIELD ID: 02A MATERIAL: PLASTER FINISH COAT ON #3 LOCATION: SPAA, SECOND FLOOR ENCLOSURE ASSOCIATED WITH CONCRETE COLUMN AT L9	WH N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %
547815	FIELD ID: 02B MATERIAL: PLASTER FINISH COAT ON #3 LOCATION: SPAA, SECOND FLOOR ENCLOSURE ASSOCIATED WITH CONCRETE COLUMN AT M21	WH N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %
547816	FIELD ID: 02C MATERIAL: PLASTER FINISH COAT ON #3 LOCATION: SPAA, SECOND FLOOR ENCLOSURE ASSOCIATED WITH CONCRETE COLUMN AT M23	WH N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %
547817	FIELD ID: 03A MATERIAL: PLASTER BASE COAT ON WIRE LATH LOCATION: SPAA, SECOND FLOOR ENCLOSURE ASSOCIATED WITH CONCRETE COLUMN AT L9	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL 100 %



LAB ID	SAMPLE DESCRIPTION	COLOR LAYERED	ANALYTICAL RESULTS	
547818	FIELD ID: 03B MATERIAL: PLASTER BASE COAT ON WIRE LATH LOCATION: SPAA, SECOND FLOOR ENCLOSURE ASSOCIATED WITH CONCRETE COLUMN AT M21	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547819	FIELD ID: 03C MATERIAL: PLASTER BASE COAT ON WIRE LATH LOCATION: SPAA, SECOND FLOOR ENCLOSURE ASSOCIATED WITH CONCRETE COLUMN AT M23	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547820	FIELD ID: 04A MATERIAL: PLASTER SKIM COAT ON GYPSUM BOARD COLUMN / STRUCTURAL STEEL ENCLOSURE LOCATION: SPAA SECOND FLOOR MEZZANINE AT COLUMN L27 BELOW CEILING	WH N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547821	FIELD ID: 04B MATERIAL: PLASTER SKIM COAT ON GYPSUM BOARD COLUMN / STRUCTURAL STEEL ENCLOSURE LOCATION: SPAA SECOND FLOOR MEZZANINE AT COLUMN L30 BELOW CEILING	WH N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547822	FIELD ID: 04C MATERIAL: PLASTER SKIM COAT ON GYPSUM BOARD COLUMN / STRUCTURAL STEEL ENCLOSURE LOCATION: SPAA SECOND FLOOR MEZZANINE AT COLUMN L32	WH N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547823	FIELD ID: 05A MATERIAL: PLASTER ROUGH COAT ON GYPSUM BOARD COLUMN / STRUCTURAL STEEL ENCLOSURE LOCATION: SPAA SECOND FLOOR MEZZANINE AT COLUMN L27 ABOVE CEILING	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547824	FIELD ID: 05B MATERIAL: PLASTER ROUGH COAT ON GYPSUM BOARD COLUMN / STRUCTURAL STEEL ENCLOSURE LOCATION: SPAA SECOND FLOOR MEZZANINE AT COLUMN L30 ABOVE CEILING	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %
547825	FIELD ID: 05C MATERIAL: PLASTER ROUGH COAT ON GYPSUM BOARD COLUMN / STRUCTURAL STEEL ENCLOSURE LOCATION: SPAA SECOND FLOOR MEZZANINE AT COLUMN L32 BELOW CEILING	GY N	NO ASBESTOS DETECTED NONFIBROUS MATERIAL	100 %

LAB ID	SAMPLE DESCRIPTION	COLOR LAYERED	ANALYTICAL RESULTS	
547826	FIELD ID: 06A	GY	NO ASBESTOS DETECTED	
	MATERIAL: PLASTER / WIRE LATH STRUCTURAL STEEL	N	CELLULOSE	02 %
	COLUMN ENCLOSURE		NONFIBROUS MATERIAL	98 %
	LOCATION: SPAA, THIRD FLOOR MECH ROOM, AREA OF COLUMN K34			
547827	FIELD ID: 06B	GY	NO ASBESTOS DETECTED	
	MATERIAL: PLASTER / WIRE LATH STRUCTURAL STEEL	N	CELLULOSE	02 %
	COLUMN ENCLOSURE		NONFIBROUS MATERIAL	98 %
	LOCATION: SPAA, THIRD FLOOR MECH ROOM, AREA OF COLUMN K34			
547828	FIELD ID: 06C	GY	NO ASBESTOS DETECTED	
	MATERIAL: PLASTER / WIRE LATH STRUCTURAL STEEL	N	CELLULOSE	02 %
	COLUMN ENCLOSURE		NONFIBROUS MATERIAL	98 %
	LOCATION: SPAA, THIRD FLOOR MECH ROOM, AREA OF COLUMN K34			




NOTES: N/A=NOT APPLICABLE

COLOR CODES:	BG BEIGE	BR BROWN	GY GRAY	OR ORANGE	RD RED	WH WHITE	GD GOLD
	BK BLACK	CL CLEAR	MU MULTI	PI PINK	SI SILVER	YL YELLOW	
	BL BLUE	GN GREEN	N/A NONE	PR PURPLE	TN TAN	MA MAROON	

LABORATORY CERTIFICATIONS: MA #AA000006 RI #AAL-129 ME #LB-0071 CT #PH-0248

ACCREDITATION: NVLAP #101781-0

DATE OF ISSUE: 02/06/17

APPROVED SIGNATORY:  KEVIN T. MCKENZIE, LABORATORY MANAGER

THESE SAMPLES WERE ANALYZED BY POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING (PLM/DS) ACCORDING TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) "INTERIM METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK INSULATION SAMPLES" (EPA-600/M4-82-020) AND "METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK BUILDING MATERIALS" (EPA-600/R93/116). THESE METHODS ARE CONSIDERED SENSITIVE TO THE PRESENCE OF ASBESTOS AT LESS THAN ONE PERCENT.

THIS REPORT RELATES ONLY TO THOSE SAMPLES ANALYZED, AND MAY NOT BE INDICATIVE OF OTHER SIMILAR APPEARING MATERIALS EXISTING AT THIS, OR OTHER SITES.

FLOOR TILES AND RESINOUSLY BOUND MATERIALS ANALYZED BY EPA METHOD 600/R93/116, "METHOD FOR THE DETERMINATION OF ASBESTOS IN BULK BUILDING MATERIALS," MAY YIELD FALSE NEGATIVE RESULTS DUE TO DIFFICULTIES IN ISOLATING SUSPECT FIBERS AND SUBSEQUENTLY IDENTIFYING THEM BENEATH THE MATRIX MATERIAL WHICH ENCAPSULATES THEM.

THE EPA REQUIRES THAT FRIABLE SAMPLES WITH ASBESTOS CONTENTS OF LESS THAN 10%, DETERMINED BY A VISUAL ESTIMATION, BE VERIFIED USING THE POINT COUNTING TECHNIQUE OR OTHERWISE BE ASSUMED TO CONTAIN GREATER THAN 1% ASBESTOS BY THE BUILDING OWNER OR OPERATOR. IF ANALYTICAL RESULTS INDICATE THE PRESENCE OF 1% OR LESS ASBESTOS IN A FRIABLE MATERIAL, THAT MATERIAL MUST BE TREATED AS ASBESTOS-CONTAINING MATERIAL UNLESS THESE QUANTITIES ARE VERIFIED USING THE POINT COUNTING TECHNIQUE. FRIABLE SAMPLES WILL BE POINT-COUNTED UPON REQUEST BY THE CLIENT. POINT COUNTING IS NOT REQUIRED FOR THOSE SAMPLES IN WHICH NO ASBESTOS IS DETECTED DURING ANALYSIS BY PLM.

ALL SAMPLES ARE STORED AT THE TRC LABORATORY FOR A PERIOD OF THREE MONTHS. FURTHER ANALYSIS OR RETURN OF SAMPLES MUST BE REQUESTED WITHIN THIS THREE-MONTH PERIOD TO GUARANTEE THEIR AVAILABILITY.

THIS REPORT MAY NOT BE REPRODUCED EXCEPT IN ITS ENTIRETY, WITHOUT PERMISSION OF THE TRC ENVIRONMENTAL LABORATORY DIRECTOR OR ONE OF THE LABORATORY SIGNATORIES. THIS REPORT MAY NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL GOVERNMENT.



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TRC Project No. 270953.0001		Client: UGS	Turnaround (circle) same day 24-hr standard (5 day)								
Samples Collected by: Michael McCarter		Contact Michael McCarter									
License # AI 001825		Phone 603-396-2600									
Date(s) Collected:		Fax									
Project Name and Location: Fire Alarm System 25 Dardas Ave. Boston MA		Email mmccarter@trcsolutions.com									
Sample ID	DO NOT WRITE IN SHADED AREAS	Stereoscopic Visual	Optical Properties	Fiber Ref. Ind.	% Asbestos Fiber Present	Fibrous Glass	Cellulose	Hair	Synthetic	Other	Non Fibrous
Field ID #	DESCRIPTION	C o l u m n 1	% T H o x i d i z e d f e r r e n c e	M o d e r n E n v i r o n m e n t	S i l i c a t e d f e r r e n c e	O r g a n i c f e r r e n c e	L	I	C H A M O C R O S I C R O M O A C T I N	A C T I N	
038	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
039	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
040	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
041	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
042	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
043	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
044	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
045	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
046	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
047	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
048	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
049	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
050	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
051	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
052	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
053	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
054	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
055	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
056	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
057	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
058	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
059	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
060	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
061	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
062	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
063	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									100
064	MATERIAL: <u>Plaster Base Coat on wire mesh</u> LOCATION: <u>SPAD-20 Floor Enclosure</u> <u>asbestos with concrete</u> <u>columns - 019</u>	9 N H 1									

Relinquished by: 22 MCH Belinda Carling Date: 2/11/17 Received by: PR/Kem Date: 2-2-17

Accept ☒ Reject ☐ Comments Analyst's Signature Date(s) Analyzed: 2/6/17 Temp: 236



TRC Project No. 270953.0001		Client: USF		Turnaround (circle) same day 24-hr standard (5 day)							
Samples Collected by: Michael McCarter		Project Name: Fire alarm system		Contact: Michael McCarter							
License # AI 001825		25 Donchester Ave Boston		Phone 603-396-2600							
Date(s) Collected: 2/1/17		and Location:		Fax: Email mmccarter@trcsolutions.com							
Sample ID	DO NOT WRITE IN SHADED AREAS	Stereoscopic Visual	Optical Properties	Fiber Ref: Ind.	% Asbestos Fiber Present	% Non Asbestos Present					
Field ID #	DESCRIPTION	C % T H M E S B P O	I o x r t i e t	C H A C C T A A C A	R M O R R E N T	Fibrous Glass	Cellulose	Hair	Synthetic	Other	Non Fibrous
Lab ID #		r o b o g h n E o r e l		L	S						
05A	MATERIAL: Plaster Rough Ceiling cylindrical column / LOCATION: structural steel enclosure SPA and floor Mezzanine	GN									100
544823		GN									
05B	MATERIAL: @ Column L27 Above ceiling LOCATION: @ Column L30 Above ceiling	GN									100
544824		GN									
05C	MATERIAL: @ Column L32 Below ceiling LOCATION: @ Column L32 Below ceiling	GN									100
544825		GN									
06A	MATERIAL: Plaster / wire lat LOCATION: structural steel column enclosure	GN									98
544826		GN									
06B	MATERIAL: Room - Area of LOCATION: Column K34	GN									98
544827		GN									
06C	MATERIAL: 7 LOCATION: 7	GN									98
544828		GN									

## SECTION 024119

## SELECTIVE STRUCTURE DEMOLITION

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Procedures for demolition and removal of existing building elements.
  - 2. Removal of designated building equipment and fixtures.
  - 3. Salvaged material.
- B. Related Documents: The Contract Documents, as defined in Section 011000- Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 013543 - Environmental Procedures: Recycling and reuse of waste materials.

## 1.2 SYSTEM DESCRIPTION

- A. The extent of Selective Demolition Work is that Work necessary, and required to facilitate the new construction indicated.
- B. Demolition shall be such that all construction, new and existing, can be performed, and completed in accordance with the construction documents.
- C. The contractor shall visit the project site and familiarize himself with the existing conditions and project requirements.
- D. Verify the scope of the Work under this Section including salvage material. The United States Postal Service will be responsible for removing all materials and equipment which the United States Postal Service wishes to salvage prior to the beginning of this Work.
- E. The existing fire protection sprinkler system shall remain in place.

## 1.3 QUALITY ASSURANCE

- A. Engage only personnel who can demonstrate not less than five years successful experience in Work of similar character.
- B. Performance Criteria:
  - 1. Requirements of Structural Work: Do not cut structural work in a manner resulting in a reduction of load-carrying capacity of load/deflection ratio.
  - 2. Operational and Safety Limitations: Do not cut operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in a manner intended or resulting in a decreased operational life, increased maintenance or decreased safety.
  - 3. Visual Requirements: Do not cut work which is exposed on the exterior or exposed in occupied spaces of the building in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the demolition work judged by the Architect to be cut and patched in a visually unsatisfactory manner.

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4. Loading: Do not superimpose loads at any point upon existing structure beyond design capacity including loads attributable to materials, construction equipment, demolition operations and shoring and bracing.
5. Vibration: Do not use means, methods, techniques or procedures which would induce vibration into any element of the structure.
6. Fire: Do not use means, methods, techniques or procedures which would produce any fire hazard unless otherwise approved by Contracting Officer.
7. Water: Do not use means, methods, techniques or procedures which would produce excessive water run-off, and water pollution.
8. Air Pollution: Do not use means, methods, techniques or procedures which would produce uncontrolled dust, fumes or other damaging air pollution.

#### 1.4 PROJECT SITE

- A. Indicated "Existing Construction" was obtained from existing drawings or other information which may not reflect actual conditions. The Contractor shall verify all existing conditions and notify the Contracting Officer of discrepancies before proceeding with the Work.
- B. Perform the removal, cutting, drilling, etc., of existing work with extreme care, and using small tools in order not to jeopardize the structural integrity of the building.
- C. Occupancy: Contractor shall not have full use of the facility during construction.
- D. Condition of Structure: The United States Postal Service assumes no responsibility for the actual condition of portions of the structure to be demolished.
- E. Partial removal: Items of salvageable value to the Contractor may be removed from the structure as the work progresses if not claimed by the United States Postal Service. Salvaged items must be transported from the site as they are removed.
- F. Protection: Make sure that the safe passage of persons around the area of demolition is maintained during the demolition operation. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

#### 1.5 PROTECTION OF EXISTING CONSTRUCTION

- A. Provide temporary protection of existing construction (floors, roof, and walls) when adjoining new work and in traffic areas.
- B. Provide temporary construction, constructed of framing and plywood, to protect existing construction and surrounding surfaces from damage by movement of materials and personnel.
- C. The contractor is responsible for all damage to existing structure and shall replace or repair all areas of damage.
- D. Repair, replace, or rebuild existing construction as required or as directed which has been removed, altered or disrupted to allow for new construction. Existing construction shall be corrected to match adjacent construction, new or existing.
- E. Perform cutting of existing concrete and masonry construction with saws and core drills. Do not use jack-hammers or explosives.

## 1.6 SHORING AND BRACING

- A. Provide temporary shoring of existing construction to allow removal of existing structural elements. Maintain shoring until new structural elements are in place and accepted.

## PART 2 - PRODUCTS

## 2.1 SALVAGED ITEMS

NOT USED

## 2.2 SALVAGED MATERIALS

- A. Removed and salvaged materials of value not designated for reinstallation, unless claimed as salvage by the United States Postal Service, shall become the property of the Contractor and shall be removed from the premises by the Contractor and recycled, reused or disposed of as specified in Section 013543- Environmental Procedures.
- B. The United States Postal Service will remove or, under separate contract, have all materials and equipment which the United States Postal Service requires removed prior to Work under this Section begins.

## 2.3 SALVAGED ITEMS FOR RE-USE

NOT USED

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

## 3.2 PREPARATION

- A. Temporary Support: Provide adequate temporary support for work to be cut to prevent failure. Do not endanger other work.
- B. Provide adequate protection of other work during selective demolition to prevent damage and provide protection of the work from adverse weather exposure.

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### 3.3 PROCEDURE

- A. Employ only skilled tradesmen to perform selective demolition.
- B. Cut work by methods least likely to damage work to the retained and work adjoining.
- C. In general, where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete and masonry work.
- D. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
- E. Where selective demolition terminates at a surface or finish to remain, completely remove all traces of material selectively demolished, including mortar beds. Provide smooth, even, substrate transition.

### 3.4 POLLUTION CONTROLS

- A. Use temporary enclosures and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level.
- B. Comply with governing authorities pertaining to environmental protection.
  - 1. Protect natural resources as specified in Section 013543 - Environmental Procedures.
- C. Clean adjacent portion of the structure and improvement of dust, dirt and debris caused by demolition operations, as directed by Contracting Officer and governing authorities. Return adjacent areas to conditions existing prior to the start of the work.

### 3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Collect, recycle, reuse, and dispose of demolished materials as specified in Section 013543 - Environmental Procedures and as approved by the U.S. Postal Service in the Solid Waste Management and Environmental Protection Plan.

### 3.6 SCHEDULE OF SELECTIVE DEMOLITION

- A. Electrical:
  - 1. Remove existing fire alarm initiating and notification devices such as pull stations, heat and smoke detectors, duct detectors, speakers, strobes, and combination speaker strobes throughout the facility.
  - 2. Remove existing remote transponder cabinets.
  - 3. Remove existing fire alarm control panels in the Postal Police Office.
  - 4. Remove all existing fire alarm wiring.
  - 5. Remove all 120 volt branch circuit wiring associated with the fire alarm system back to source.
- B. Provide additional selective demolition as indicated and required by the Contract Documents and as required for indicated new construction.

END OF SECTION

USPS CSF Specifications issued: 5/1/2014  
Last revised: 4/12/2011

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## SECTION 078400

## FIRESTOPPING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Firestopping in fire-rated wall assemblies.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

## 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM E 119 - Test Methods for Fire Tests of Building Construction and Materials.
  - 2. ASTM E 814 - Test Methods for Fire Tests of Through Penetration Fire Stops.
- B. Underwriters' Laboratories, Inc. (UL):
  - 1. UL 1479 - Fire Tests of Through-Penetration Firestops.

## 1.3 DEFINITIONS

- A. Firestopping: Sealing material or assembly placed in spaces between building materials to stop movement of smoke, heat, gasses, or fire through wall openings.

## 1.4 SYSTEM DESCRIPTION

- A. Firestopping Materials: ASTM E 119, ASTM E 814, UL 1479 to achieve a fire rating as indicated on Drawings.

## 1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures of submittals.
  - 1. Product Data: Product characteristics, performance, and limitation criteria.
  - 2. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
    - b. Qualification Documentation: Firestopping installer documentation of experience indicating compliance with specified qualification requirements.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of this Section with minimum 5 years documented experience.

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## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Products in manufacturer's original unopened containers or packages with labels intact, identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions, where applicable.
- B. Store and handle materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## 1.8 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements:
  - 1. Do not install materials when temperature of substrate material and ambient air is below 60 degrees F.
  - 2. Maintain minimum temperature before, during, and for 3 days after installation of materials.
  - 3. Keep away from heat, open flame, sparks, or other sources of ignition until curing is complete. Use only with adequate ventilation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturer's offering firestopping materials which may be incorporated in the work include the following:
  - 1. Nelson Firestop Products, Tulsa, OK (800) 331-7325.
  - 2. Hilti Firestop Systems, Tulsa, OK (800) 879-8000.
  - 3. The Rectorseal Corporation, Houston, TX (800) 231-3345.
  - 4. Specified Technologies, Incorporated (STI), Somerville, NJ (800) 992-1180.
  - 5. 3M Fire Protection Products, St. Paul, MN (800) 328-1687.
  - 6. Tremco Firestop System, Beechwood, OH (800) 321-7906.
- B. Other products such as USG Firestop System by U.S. Gypsum Co. are acceptable if complying with requirements.
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

### 2.2 MATERIALS

- A. Intumescent Latex Sealant: Single-component, intumescent, latex formulation.
  - 1. LBS, by Nelson Firestop Products.
  - 2. Metacaulk 950 or 1000, by RectorSeal.
  - 3. SpecSeal SSS100, by STI.
  - 4. CP 25WB+, by 3M.
  - 5. TREMstop WBM, by Tremco.
- B. Intumescent Solvent-Release-Curing Sealant: Single component, intumescent, synthetic-polymer based, non-sag grade.
  - 1. CP 25N/S, by 3M.
  - 2. TREMstop WBM, by Tremco.

- C. Intumescent Wrap/Strip: Single-component, elastomeric sheet with aluminum foil on one face.
  - 1. WRS, by Nelson Firestop Products.
  - 2. Metacaulk Wrap Strip, by RectorSeal.
  - 3. SpecSeal SSWRED Wrapstrip, by STI.
  - 4. FS-195+ Wrap/Strip, by 3M.
  - 5. TREMstop WS, by Tremco.
- D. Intumescent Putty: Single-component, non-hardening, dielectric, intumescent putty.
  - 1. FSP, by Nelson Firestop Products.
  - 2. Metacaulk Fire Rated Putty, by RectorSeal.
  - 3. SpecSeal Putty, by STI.
  - 4. Moldable Putty+, by 3M.
- E. Silicone Sealant: Single-component, moisture-curing, silicone-based elastomeric, non-sag grade.
  - 1. CLK N/S, by Nelson Firestop Products.
  - 2. FS 601, by Hilti.
  - 3. Metacaulk 835+, by RectorSeal.
  - 4. SpecSeal PEN 300, by STI.
  - 5. 2000+ Silicone, by 3M.
  - 6. FYRE SIL, by Tremco.
- F. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, nonshrinking foam.
  - 1. FS Fireblocks, by Hilti.
  - 2. SpecSeal PEN 200, by STI.
  - 3. 2001 Silicone RTV Foam, by 3M.
- G. Intumescent Collar: Factory-fabricated, intumescent collar.
  - 1. PCS, by Nelson Firestop Products.
  - 2. CP 642, by Hilti.
  - 3. Metacaulk Pipe Collar, by RectorSeal.
  - 4. SpecSeal SSC Collars, by STI.
  - 5. Plastic Pipe Device, by 3M.
  - 6. TREMstop D, by Tremco.
- H. Intumescent Composite Sheet or Pillows and Mortar: Intumescent sheet used to firestop large openings.
  - 1. CPS, by Nelson Firestop Products.
  - 2. SpecSeal SSB Pillows and SpecSeal SSM Firestop Compound, by STI.
  - 3. CS-195+ Composite Sheet, by 3M.
  - 4. TREMstop PS, by Tremco.
- I. Packing Material: Manufacturer's standard mastic, putty, ceramic fiber blanket, or mineral wool to be used as fill or backing material for firestopping.
  - 1. FSB or Mineral Wool, by Nelson Firestop Products.
  - 2. Mineral Wool, by Hilti.
  - 3. Fire Safing or Backer Rod, by RectorSeal.
  - 4. Mineral Wool Safing, by STI.
  - 5. FireMaster Mastic, FireMaster Putty, or FireMaster Bulk, by 3M.
  - 6. Cerablanket, by Tremco.



## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to United States Postal Service.

### 3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Place hangers or damming materials in penetration to hold firestopping materials where required.

### 3.3 INSTALLATION

- A. Follow manufacturer charts for appropriate material to achieve required fire rating in various locations.
- B. Install firestopping at penetrations of fire rated wall materials by sleeves, piping, ductwork, conduit, and other items in accordance with manufacturer's published instructions.

### 3.4 CLEANING AND PROTECTION

- A. Clean excessive fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturer's of firestopping Products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations.
- C. If damage occurs, cut out and remove damaged or deteriorated firestopping and install new materials.

### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Inspection procedures.
- B. Contracting Officer will inspect each firestopping installation. Do not cover firestopping installations that will be concealed by other construction until Contracting Officer inspection.

## 3.6 SCHEDULES

A. Provide firestopping complying with UL assemblies specified below.

Penetration	Assembly	Nelson	Hilti	RectorSeal	STI	3M	Tremco
Metal Pipe	CMU Wall 8" Thick or Less	CAJ1224 or CAJ1203	CAJ1150 or CAJ1158	CAJ1114 or CAJ1115	CAJ1079 or CAJ1217	CAJ1001 or CAJ1009	CAJ1179 or CAJ1187
	Gypsum Board Partition	WL1083 or WL1030	WL1052 or WL1054	WL1026 or WL1034	WL1049 or WL1079	WL1003 or WL1009	WL1020 or WL1051
Non-Metallic Pipe	CMU Wall 8" Thick or Less	CAJ2086	CAJ2095 or CAJ2109	CAJ2021 or WJ2025	CAJ2064 or CAJ2045	CAJ2005	CAJ2082 or FA2024
	Gypsum Board Partition	WL2071	WL2078	WL2015 or WL2104	WL2093 or WL2029	WL2002 or WL2005	WL2083 or WL2082
Cable Tray	CMU Wall 8" Thick or Less	CAJ8049 or CAJ4033	CAJ4017	CAJ8043	CAJ4020 or CAJ4029	CAJ4003 or CBJ4020	CAJ4007 or WJA4005
	Gypsum Board Partition	WL4003	WL4006	N/A	WL4005 or WL4008	WL4004	WL3043 or WL3044
Insulated Metal Pipe	CMU Wall 8" thick or Less	CAJ5008 or CAJ5059	CAJ5045	WJ5016 or CAJ5070	CAJ5021 or CAJ5029	CAJ5001 or CAJ5002	CAJ5052 or CBT5005
	Gypsum Board Partition	WL5036	WL5022 or WL5029	WL5057	WL5014 or WL5051	WL5001	WL5034
Construction Gaps	CMU Wall to Metal Deck	N/A	HW-D-0008	TRC/PV120-14	U900Z020	U900Z028	U900Z013 or U900Z014
	Gypsum Board Partition to Metal Deck	N/A	HW-D-0003 or HW-D-0004	HWD0014 or TRC/PV120-14	HWD1001	U400V	WHPV60.01 or U900Z014

END OF SECTION

USPS CSF Specifications issued: 5/1/2014  
 Last revised: 4/12/2011

## SECTION 079200

## JOINT SEALANTS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Preparing sealant substrate surfaces.
  - 2. Sealant and backing.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 078400 - Firestopping: Firestopping sealant at fire-rated assemblies.

## 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C717 - Standard Terminology of Building Seals and Sealants.
  - 2. ASTM C834 - Specification for Latex Sealants.
  - 3. ASTM C920 - Specification for Elastomeric Joint Sealants.
  - 4. ASTM D1056 - Flexible Cellular Material- Sponge or Expanded Rubber.
- B. Federal Specifications (FS):
  - 1. FS SS-S-200 - Sealing Compounds, Two Component, Elastomeric, Polymer Type, Jet-Fuel Resistant, Cold Applied.
  - 2. FS TT-S-1657 - Sealing Compound, Single Component Butyl Rubber Based Solvent Release Type (for Buildings and other Types of Construction).

## 1.3 SUBMITTALS

- A. Section 013300 – Submittal Procedures: Procedures for submittals.
  - 1. Product Data: Product chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Warranty: Submit manufacturer warranty with forms completed in United States Postal Service name and registered with manufacturer.

## 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing Work of this Section with minimum 5 years documented experience.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Deliver Products in manufacturer's original unopened containers or packages with labels intact, identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions, where applicable.
- C. Store and handle materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## 1.6 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Environmental Requirements: Install sealant during manufacturer's recommended temperature ranges and weather conditions for application and cure. Consult manufacturer when sealant cannot be applied during recommended conditions.

## 1.7 WARRANTY

- A. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
- B. Warranty:
  - 1. Submit written warranty signed by sealant manufacturer agreeing to replace sealants and accessories which fail because of loss of cohesion or adhesion or which do not cure.
  - 2. Warranty Period: 5 years or longer per the manufacturers' standard warranties.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated into the work include the following:
  - 1. Bostik, Inc, Huntingdon Valley, PA, (800) 523-2678, (125) 674-5600.
  - 2. Dow Corning, Midland, MI (517) 496-4000.
  - 3. GE Silicones, Waterford, NY (518) 233-3330.
  - 4. Mameco International, Cleveland, OH, (800) 321-6412, (216) 752-4400.
  - 5. W.R. Meadows, Inc, Elgin, IL (800) 342-5976, (847) 683-4500.
  - 6. Nomaco, Inc., Zebulon, NC, (919) 269-6500.
  - 7. Pecora Corporation, Harleysville, PA, (800) 523-6688, (215) 723-6051.
  - 8. Sika Corporation, Lyndhurst, NJ, (800) 933-7452, (201) 933-8800.
  - 9. Sonneborn Building Products Div. ChemRex, Inc., Shakopee, MN (800) 243-6739, (612) 496-6000.
  - 10. Tremco, Beachwood, OH, (800) 852-3821, (216) 292-5000.
  - 11. USG Corp., Chicago, IL (800) 874-4968, (312) 606-4000.

## 2.2 BUILDING SEALANTS (See Sealant Schedule at the end of this Section for specific use of sealants.)

### A. Urethanes:

1. Type 1: Two-Part Urethane: Self-Leveling, ASTM C920, Type M, Grade P, Class 25.
  - a. Chem-Calk CC-550, by Bostik.
  - b. Vulkem 245, by Mameco.
  - c. Vulkem 255, Wide-Joint, by Mameco.
  - d. NR-200 Urexpam, by Pecora Corporation.
2. Type 2: Two-Part Urethane: Non-Sag, ASTM C920, Type M, Grade NS, Class 25.
  - a. Chem-Calk 500, by Bostik.
  - b. Vulkem 227, by Mameco.
  - c. Sonolastic NP 2, by Sonneborn Building Products, ChemRex Inc.
3. Type 3: One-Part Urethane: Self-Leveling, ASTM C920, Type S, Grade P, Class 25.
  - a. Vulkem 45, by Mameco.
  - b. Urexpam NR-201, by Pecora Corporation.
  - c. Sonolastic SL1, by Sonneborn Building Products, ChemRex Inc.
  - d. Sikaflex 1C-SL by Sika.
4. Type 4: One-Part Urethane: Non-Sag, ASTM C920, Type S, Grade NS, Class 25.
  - a. Chem-Calk 900, by Bostik.
  - b. Vulkem 116, by Mameco.
  - c. Sonolastic NP I, by Sonneborn Building Products, ChemRex Inc.

### B. Silicones:

1. Type 1: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 50.
  - a. 795 Silicone Building Sealant, by Dow Corning.
  - b. 864 Architectural Silicone Sealant, by Pecora Corporation.
2. Type 2: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 25.
  - a. 999-A Silicone Building & Glazing Sealant, Dow Corning.
  - b. Construction 1200 Sealant, General Electric Company.
3. Type 3: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 25. Vertical Surfaces Only.
  - a. Construction 1200 Sealant, General Electric Company.
  - b. 999-A, Dow Corning.
  - c. 860 Glaziers and Contractors Silicone Sealant, by Pecora Corporation. (colors only)
4. Type 4: One-Part Silicones: ASTM C920, Type S, Grade NS, Class 25 or 50.
  - a. 786 Mildew Resistant Silicone Sealant, Dow Corning.
  - b. SCS 1700 Sanitary Sealant, General Electric.
  - c. 898 Silicone Sanitary Sealant, Pecora Corporation.

### C. Acrylics, Latex:

1. Type 1: One-Part Acrylic Latex, Non-Sag, ASTM-C-834-76.
  - a. Chem-Calk 600, by Bostik.
  - b. LC-130, by MACCO Adhesives, The Glidden Company.
  - c. Easa-ply ALS, by W. R. Meadows, Inc.
  - d. AC-20+Silicone Acrylic Latex, by Pecora Corporation.
  - e. Sonolac, Sonneborn Building Products, ChemRex Inc.

### D. Acoustical Sealants:

1. Type 1: AC-20 FTR Acoustical and Insulation Sealant, by Pecora Corporation.
2. Type 2: 60+ Unicrylic, by Pecora Corporation.
3. Type 3: Sheetrock Acoustical Sealant, by United States Gypsum.

### E. Butyls:

1. Type 1: One-Part Butyl, Non-Sag, FS TT-S-1657.
  - a. Chem-Calk 300, by Bostik.
  - b. BC-158 Butyl Rubber, by Pecora Corporation. (ASTM C1085)

- F. Preformed Compressible & Non-Compressible Fillers:
  - 1. Type 1: Backer Rod - Closed cell polyethylene foam:
    - a. HBR Backer Rod, by Nomaco.
    - b. #92 Greenrod, by Nomaco.
    - c. Sonofoam Closed-Cell Backer Rod, Sonneborn Building Products, ChemRex Inc.
  - 2. Type 2: Backer Rod - Open cell polyurethane foam:
    - a. Denver Foam, by Backer Rod Mfg Inc.
    - b. Foam Pack II, by Nomaco.
  - 3. Type 3: Neoprene compression seals:
    - a. WE, WF, and WG Series, by Watson Bowman & Acme Corp.
    - b. Will-Seal 150 Precompressed Expanding Foam Sealants, by Will-Seal, a Division of Illbruck.
  - 4. Type 4: Butyl Rod: Kirkhill Rubber Co. (714)529-4901.
- G. Bond Breaker Tape: Polyethylene tape of plastic as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate of joint filler must be avoided for proper performance of sealant.

## 2.3 PAVING SEALANTS

NOT USED

## 2.4 COLORS

- A. Generally use sealant colors matching color of material joint is located in.
- B. Where a joint occurs between two materials of differing colors and Contractor cannot determine which material to match, contact Contracting Officer for selection.

## 2.5 ACCESSORIES

- A. Joint Cleaner: Provide type of joint cleaning compound recommended by sealant manufacturer for joint surfaces to be cleaned.
- B. Primer: As recommended by sealant manufacturer.
- C. Masking tape and similar accessories to protect surfaces from damage.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify that joint widths are in conformance with sealant manufacturer allowable limits.
  - 2. Verify that contaminants capable of interfering with adhesion have been cleaned from joint and joint properly prepared.

- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 PREPARATION

- A. Prepare and size joints in accordance with manufacturer's instructions. Clean substrates of dirt, laitance, dust, or mortar using solvent, abrasion, or sandblasting as recommended by manufacturer. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Verify that joint backing and release tapes are compatible with sealant. Verify sealant is suitable for substrate. Verify that sealant is paintable if painted finish is indicated.
- C. Protect materials surrounding work of this Section from damage or disfiguration.

### 3.3 INSTALLATION

- A. Install sealant in accordance with manufacturer's published instructions.
- B. Prime or seal joint surfaces where recommended by sealant manufacturer. Do not allow primer or sealer to spill or migrate onto adjoining surfaces.
- C. Install backer rod and bond breaker tape where required by manufacturer.
- D. Install preformed compressible and non-compressible fillers in accordance with manufacturer's published instructions.
- E. Install sealants to depths recommended by sealant manufacturer in uniform, continuous ribbons free of air pockets, foreign embedded matter, ridges, and sags, "wetting" joint bond surfaces equally on both sides.
- F. Tool joints concave unless shown otherwise. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form slight cove so that joint will not trap moisture and foreign matter. Dry tool joints. Do not use soap, water, or solvent to tool joints.

### 3.4 CURING

- A. Cure sealants in compliance with manufacturer's published instructions.

### 3.5 CLEANING

- A. Remove excess and spillage of sealants promptly as the work progresses, using materials and methods as recommended by sealant and substrate manufacturers. Clean adjoining surfaces to eliminate evidence of spillage without damage to adjoining surfaces or finishes.

### 3.6 SEALANT SCHEDULE

- A. Exterior Joints:
  - 1. Perimeters of exterior openings where frames and other penetrations meet exterior facade of building: precast concrete, brick, CMU, polymer reinforced concrete.
    - a. Sealant Urethane Type 2
    - b. Sealant Silicone Type 1 (for prefinished materials only)
- B. Interior Joints:
  - 1. Seal interior perimeters of exterior openings.
    - a. Sealant Urethane Type 2
    - b. Sealant Urethane Type 4
    - c. Sealant Silicone Type 1 (for prefinished materials only)

END OF SECTION

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## SECTION 260500

## COMMON WORK RESULTS FOR ELECTRICAL

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes:
  - 1. Basic electrical methods.
  - 2. Grounding and bonding.
  - 3. Hangers and supports.
  - 4. Electrical identification.
  - 5. Electrical system testing and inspection.
- B. Related Documents: The contract documents, as defined in Section 011000 – Summary of Work, apply to the work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
- C. Related Sections:
  - 1. Section 078400 - Firestopping
  - 2. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
  - 3. Section 260533 - Raceway and Boxes for Electrical Systems
  - 4. Section 283100 - Fire Detection and Alarm

## 1.2 REFERENCES

- A. National Electrical Contractors Association (NECA):
  - 1. NECA SI - Standard of Installation.
- B. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA KS 1 - Enclosed Switches.
- C. National Electrical Testing Association (NETA):
  - 1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- D. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code.

## 1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data:
    - a. Grounding equipment.
    - b. Conduit.
    - c. Wire.
  - 2. Assurance/Control Submittals:
    - a. Certificates: Manufacturer's certificate that each Product specified meet or exceed specified requirements.
    - b. Qualification Documentation: Submit documentation of experience indication compliance with specified qualification requirements.

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- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals.
  - 1. Project Record Documents: Accurately record the following.
    - a. Locations of all new devices.
    - b. Routing of all wiring and raceways.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing Work of this Section with minimum 5 years documented experience.
- B. Regulatory Requirements:
  - 1. Products: Listed and classified by Underwriters Laboratories, Incorporated as suitable for the purpose specified and indicated.
  - 2. Work herein shall conform to all applicable laws, ordinances and regulations in accordance with the latest applicable requirements of:
    - a. National Electrical Manufacturer's Associates.
    - b. Standards of National Fire Protection Association (NFPA 72, 90A and 101).
    - c. Underwriter's Laboratories.
    - d. Occupational Safety and Health Agency Standards.
    - e. Illuminating Engineering Society Handbook.
    - f. The International Existing Building Code.
    - g. The International Electrical Code.
    - h. ASHRAE Standard 90.1 – 2010.
    - i. The International Energy Conservation Code.

#### 1.5 BASIC ELECTRICAL METHODS

- A. Drawings are schematic and diagrammatic. Use judgment and care to install electrical Work to function properly and fit within building construction and finishes. Electrical conductors, conduit, components, not shown or specified, which are required for any device or system to produce a complete and operative system are required to be furnished and installed.
- B. Exact location of outlets are determined from dimension on Drawings, manufacturer's shop drawings, or as may be determined at Project Site. Do not scale Drawings for exact location of any item. Verify item mounting heights as required by project conditions prior to rough-in.
- C. Route conduits and wiring associated with new equipment and systems above ceilings, in existing chases, and concealed within building structure.
- D. Surface mounted raceways or conduit permitted only at locations indicated on Drawings.
- E. Circuit grouping, conduit or cable runs and home runs are indicated with number of conductors shown in each raceway to clarify operation and function of various systems. Provide proper number of conductors and conduits or cables to provide operative system as indicated on Contract Documents. Do not regroup any feeder circuits, branch circuits, home runs, and zone alarms at any point, from that shown on Contract Documents. Each conduit run shall contain no more than (6) current carrying conductors.
- F. Branch and home run circuits are indicated as 2, 3, or 4 wire circuits unless otherwise noted. Do not connect two ungrounded conductors to same circuit breaker/fused switch in any panel. Circuit runs consist of a maximum of five conductors; 3 phase conductors, 1 neutral conductor, and 1 equipment ground conductor, unless otherwise noted. Do not splice branch circuit conductors in any panels, safety switches, or circuit breakers in separate enclosures.

- G. The sharing of neutral conductors for multiwire branch circuits is prohibited. All branch circuits shall contain individual neutrals.
- H. Proposed equipment, switches or devices, shown mounted on and/or adjacent to equipment, which if installed, would impair proper operation of existing or new equipment, shall be removed and relocated by Contractor as required so equipment will function properly. Notify Contracting Officer immediately if any such condition exists.
- I. Seal and make permanently watertight penetrations by electrical raceways or equipment through ceilings, walls or floors.
  - 1. Seal penetrations in non-fire rated ceilings, walls or floors material specified in Section 079200 – Joint Sealants.
  - 2. Seal penetrations in fire rated walls with material specified in Section 078400 - Firestopping.
- J. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A, and NFPA 70.
- K. Install equipment and materials to provide required maintenance and code working clearance for servicing and maintenance. Coordinate final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow required space for removal of parts that require replacement or servicing.
- L. Remove existing equipment, control panels, transponder cabinets, alarm initiating and notification appliances as required to facilitate proposed installation and as specified in Section 024119 - Selective Structure Demolition. Remove existing wiring and conduit serving items to be removed. Conduit in inaccessible areas shall be cut off below finished surfaces and existing surface patched to match existing. Provide blank plates on existing flush mounted outlet boxes that will be abandoned. Remove all abandoned conductors from raceways.

## PART 2 - PRODUCTS

### 2.1 GROUNDING AND BONDING

- A. Grounding System Resistance: Five ohm.
- B. Mechanical Connectors: Bronze.
- C. Electrode Conductor:
  - 1. Material: Insulated stranded copper.
  - 2. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

### 2.2 HANGERS AND SUPPORTS

- A. Product Requirements: Furnish and install approved materials, sizes, and types of anchors, fasteners, and supports to carry loads of equipment and conduit, including weight of wire in conduit plus 300 pounds.
- B. Materials and Finishes: Corrosion resistive.

- C. Anchors and Fasteners:
  - 1. Steel Structural Elements: Beam clamps and welded fasteners.
  - 2. Concrete Surfaces: Self-drilling anchors and expansion anchors.
  - 3. Hollow Masonry, Plaster, and Gypsum Board Partitions: Toggle bolts and hollow wall fasteners.
  - 4. Solid Masonry Walls: Expansion anchors.
  - 5. Sheet Metal: Sheet metal screws.
  - 6. Wood: Wood screws.

## 2.3 ELECTRICAL IDENTIFICATION

- A. Nameplates:
  - 1. Engraved three-layer laminated phenolic plastic, white letters on black background.
  - 2. Locations:
    - a. Each electrical distribution and control equipment enclosure.
    - b. Terminal Cabinets.
    - c. Pull boxes.
    - d. Relays.
    - e. Switches and disconnects.
  - 3. Letter Size:
    - a. Use 1/8 inch letters for identifying individual equipment and loads.
    - b. Use 1/4 inch letters for identifying grouped equipment and loads.
- B. Wire and Cable Markers:
  - 1. Description: Cloth tape or tubing type wire markers.
  - 2. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.
  - 3. Identification:
    - a. Power and Lighting Circuits: Branch circuit or feeder number indicated on Drawings.
    - b. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on Drawings.

## 2.4 MOTOR STARTERS, CONTROLS, AND CONNECTIONS TO MECHANICAL EQUIPMENT

NOT USED

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

### 3.2 INSTALLATION - GROUNDING AND BONDING

- A. Provide bonding and grounding in conformance with NFPA 70.
- B. Equipment Grounding Conductor: Provide separate, insulated conductor within all lighting and power raceways. Terminate each end on suitable lug, bus, or bushing.
- C. Testing and Inspection:
  - 1. Inspect and test in accordance with NETA ATS, where applicable.
  - 2. Perform inspections and tests listed in NETA ATS, Section 7.13.
  - 3. Test ground resistance of system with ground resistance tester. The resistance of the grounding system shall not exceed 5 ohms. Where tests show resistance-to-ground is over 5 ohms, take appropriate action to reduce resistance to 5 ohms, or less, but driving additional ground rods; then retest to demonstrate compliance. Install rods at least 8 feet apart.
  - 4. Method for testing individual ground rods and overall grounding system shall be accomplished by the three point method per military handbook 419. Test probes shall be placed minimum of 30 feet and 60 feet from rod being tested. Furnish written report of all test results for all ground rods.

### 3.3 INSTALLATION - HANGERS AND SUPPORTS

- A. Install products in accordance with manufacturer's published instructions.
- B. Furnish and install anchors, fasteners, and supports in accordance with NECA SI.
- C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
- D. Do not use spring steel clips and clamps.
- E. Do not use powder-actuated anchors.
- F. Obtain permission from structural engineer before drilling or cutting structural members.
- G. Fabricate supports from structural steel angle or structural steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- I. In wet and damp locations use structural steel channel supports to stand cabinets and panelboards one inch off wall.
- J. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

### 3.4 INSTALLATION - ELECTRICAL IDENTIFICATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using stainless steel screws. Use minimum two screws at each end of nameplate.
- C. Secure nameplate to outside surface of door on panelboards and switchboards.

### 3.5 INSTALLATION – MOTOR STARTERS, CONTROLS, AND CONNECTIONS TO MECHANICAL EQUIPMENT

NOT USED

### 3.6 FIELD QUALITY CONTROL - ELECTRICAL TESTING AND INSPECTION

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Section 260800 - Commissioning of Electrical Systems: Requirements related to Division 26 Commissioning
- C. Conduct testing to Determine that Electrical Equipment and Systems:
  - 1. Are in conformance with Contract Documents and applicable reference standards.
  - 2. Is properly installed without damage due either to installation or shipment.
  - 3. Operate correctly, meet design intent, and are performing at optimum level, in safe manner.
- D. Provide a complete written record of operational values to be used as a baseline for future operational testing.
- E. Instrumentation:
  - 1. Provide calibration program that assures applicable test instrumentation is maintained within rated accuracy and directly traceable to National Bureau of Standards.
  - 2. Calibrate instruments in accordance with following frequency schedule:
    - a. Field Instruments:
      - 1) Analog - 6 months maximum.
      - 2) Digital - 12 months maximum.
    - b. Leased Specialty Equipment: 12 months. (Where accuracy is guaranteed by lessor.)
  - 3. Dated Calibration Labels: Visible on test equipment.
  - 4. Keep records current; Show date and result of instruments calibrated or tested.
  - 5. Maintain current instrument calibration instruction and procedure for each test instrument.
  - 6. Calibrating Standard: Higher accuracy than that of instrument being calibrated.
- F. Regulatory Requirements:
  - 1. Safety Practices: Include, but not limited to, the following requirements:
    - a. Occupational Safety and Health Act of 1970 - OSHA.
    - b. Accident Prevention Manual for Industrial Operations, Seventh Edition, National Safety Council, Chapter 4.
    - c. Applicable State and Local Safety Operating Procedures.
    - d. NETA Safety/Accident Prevention Program.
    - e. United States Postal Service Safety Practices.
    - f. NFPA 70E - Electrical Safety Requirements for Employee Workplace.
    - g. American National Standards for Personnel Protection, ANSI Z244.1.
  - 2. Perform tests with apparatus de-energized except where otherwise specifically required herein.
  - 3. Provide a designated safety representative present at Project Site and supervise safety operations.
  - 4. Power Circuits: Conductors shorted to ground by a hot line grounded device approved for the purpose.
  - 5. Do not proceed until safety representative has determined that it is safe to do so.
  - 6. Provide sufficient protective barriers and warning signs to conduct specified tests safely.
- G. Tests and inspections include, but are not limited to the following:
  - 1. Proper operation of equipment.
  - 2. Continuity of raceway system.
  - 3. Insulation leakage and impedances.
  - 4. Ground system resistance.

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5. Elimination of reverse rotation and single-phasing of motors.
  6. Sub-system tests indicated in other Sections.
  7. Proper operation of fire alarm system specified in Section 283100.
- H. Load balance all electrical phases, at device, panels, and switchboards.
- I. Perform electrical system testing and inspection as specified in each related Section and as specified in this Section.

END OF SECTION

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## SECTION 260519

## LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

## PART 1 - GENERAL

## 1.1 SUMMARY:

- A. Section Includes:
  - 1. Building wire and cable.
  - 2. Branch-circuit cable.
  - 3. Wiring connectors and connections.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections
  - 1. As specified in Section 260500 - Common Work Results for Electrical: Basic electrical methods.

## 1.2 REFERENCES

- A. As specified in Section 260500 – Common Work Results for Electrical.

## 1.3 SUBMITTALS

- A. As specified in Section 260500 - Common Work Results for Electrical.

## 1.4 QUALITY ASSURANCE

- A. As specified in Section 260500 – Common Work Results for Electrical.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Deliver in accordance with NEMA WC 26.

## PART 2 - PRODUCTS

## 2.1 BUILDING WIRE AND CABLE

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
  - 1. Alcan Cable, Atlanta, GA (770) 392-2376.
  - 2. Anixter, Inc., Skokie, IL (800) ANIXTER.
  - 3. General Cable, Highland Heights, KY (800) 526-4391.

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4. Cerrowire, Hartselle, AL (256) 773-2522.
5. Okonite, Ramsey, NJ (201) 825-0300.
6. Southwire Company, Carrollton, GA (800) 444-1700.
7. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

B. Description: Single conductor insulated wire.

C. Conductor: Copper, except conductors #1/0 AWG and larger may be compact stranded aluminum if equipped with compression lugs and installed per manufacturer's recommendations and the National Electrical Code.

D. Insulation Voltage Rating: 600 Volts.

E. Insulation: NFPA 70, Type THHN/THWN or Type XHHW-2

F. Multiconductor cable: Metal clad cable, Type MC with ground wire.

1. Type "MC" cable shall be permitted for use in exposed or accessible ceiling spaces only. Type "MC" cable shall not be utilized above inaccessible hard ceilings or in damp locations. Cable shall be supported and secured where such support does not exceed 3 ft. intervals and shall be properly color coded to identify phase, neutral, ground and switch legs.

## 2.2 WIRING CONNECTORS

A. Manufacturers: Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:

1. Buchanan Construction Products, Hackettstown, NJ (800) 610-5201.
2. Thomas and Betts, Memphis, TN (800) 695-1901.
3. 3M, St. Paul, MN (800) 364-3577.
4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

B. Compression Connectors; Conductor sizes #12 through #6 AWG:

1. Buchanan: 2006S or 2011S.

## 2.3 DROP CORDS

NOT USED

## 2.4 BUSWAYS

NOT USED

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. As specified in Section 260500 – Common Work Results for Electrical.

### 3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

### 3.3 INSTALLATION - CONDUCTORS

- A. Wiring methods
  - 1. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation in metallic raceway or MC multiconductor cable.
  - 2. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation in metallic raceway or MC multiconductor cable.
  - 3. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or Type XHHW-2 insulation in metallic raceway or MC multiconductor cable.
  - 4. Wet or Damp Interior Locations: Use only building wire, Type THW or THWN or Type XHHW-2 insulation in raceway.
- B. Install products in accordance with manufacturers published instructions and NECA SI.
- C. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- D. Use stranded conductors for control circuits and final connections to all vibration equipment.
- E. Use conductor not smaller than 12 AWG for power and lighting circuits.
- F. Use conductor not smaller than 14 AWG for control circuits.
- G. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
- H. Pull all conductors into raceway at same time.
- I. Use approved wire pulling lubricant for all building wire.
- J. Protect exposed cable from damage.
- K. Neatly train and lace wiring inside boxes, equipment, and panelboards in accordance with NECA Standards.
- L. Clean conductor surfaces before installing lugs and connectors.
- M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- N. For splices and taps, use only compression connectors for copper conductors, 6 AWG and larger or aluminum conductors 1/0 and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- O. Use solderless pressure compression connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- P. Use conductors rated 90 degrees C, inside a ballast compartment or within 6 inches of any ballast.
- Q. Conductor Sizes #8 and Larger: Class B stranding.
- R. The sharing of neutral conductors for multiwire branch circuits is prohibited. All branch circuits shall contain individual neutral conductors.

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### 3.4 INSTALLATION – BUSWAYS

NOT USED

### 3.5 CONSTRUCTION

#### A. Interface With Other Work:

1. Identify wire and cable using Thomas and Betts type WM vinyl markers.
2. Identify each conductor with its circuit number or other designation indicated on Drawings in all junction, pull, terminal boxes and cabinets. Identify neutrals with common circuit numbers in all junction, pull and terminal boxes, panels and cabinets.

### 3.6 WIRING COLOR CODE

#### A. Comply with the following color code for each voltage system.

#### B. 208Y/120 Volt System:

1. Phase A - Black
2. Phase A Switch Leg - Black with "S" tag.
3. Phase B - Red
4. Phase B Switch Leg - Red with "S" tag.
5. Phase C - Blue.
6. Phase C - Switch Leg - Blue with "S" tag.
7. Travelers - Yellow.
8. Neutral - White.
9. Equipment Ground - Green.

#### C. Use same color for same phase throughout. Use same colors for switch legs. Travelers shall be yellow. Phase rotation shall be same in all panels. Identify large cables with colored tape.

#### D. Provide identification tags on each conductor entering panel, switch, junction box and pull box to identify conductor.

### 3.7 FIELD QUALITY CONTROL

#### A. As specified in Section 260500 – Common Work Results for Electrical.

#### B. Cables, 600 Volt or less and size no. 3 or larger, shall be meggered using an industry-approved "megger with a minimum of 500 Volt internal generating voltage. All inspection, cleaning and testing procedures shall be in compliance with the recommendations and standards outlined in the "maintenance testing specifications for electrical power distribution equipment and systems", latest edition, published by International Electrical Testing Association (NETA). Insulation resistance test values shall be no less than 250 megaohms. A typewritten report of all readings shall be prepared and submitted.

END OF SECTION

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POWER CONDUCTORS AND CABLES

## SECTION 260533

## RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Metal conduit.
  - 2. Flexible metal conduit.
  - 3. Liquidtight metal conduit.
  - 4. Electrical metallic tubing.
  - 5. Fittings and conduit bodies.
  - 6. Wall and ceiling outlet boxes.
  - 7. Pull and junction boxes.
- B. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- C. Related Sections:
  - 1. Section 283100 – Fire Detection and Alarm.
  - 2. Section 260500 - Common Work Results for Electrical: Supporting devices, electrical identification, grounding and bonding.

## 1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM A 123 - Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
- B. American National Standards Institute (ANSI):
  - 1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
  - 2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
  - 3. ANSI C80.5 - Rigid Aluminum Conduit.
- C. National Electrical Contractors Association (NECA):
  - 1. NECA "Standard of Installation."
- D. National Electrical Manufacturers Association (NEMA):
  - 1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 70 - National Electrical Code.

## 1.3 SYSTEM DESCRIPTION

- A. Design Requirements
  - 1. Conduit Size: NFPA 70, unless indicated otherwise on Drawings.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
  1. Conform to requirements of NFPA 70.
  2. Provide products listed and classified by Underwriters Laboratories, Incorporated.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
- B. Accept conduit on site. Contractor inspect for damage prior to acceptance.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

### PART 2 - PRODUCTS

#### 2.1 CONDUIT REQUIREMENTS

- A. Where conduit is required by standards, codes, or required elsewhere, minimum size shall be as follows:
  1. 1/2 inch for power and branch circuit wiring, unless indicated otherwise. All homerun conduits shall be 3/4 inch, minimum.
  2. 3/4 inch for low voltage, control, and fire alarm unless indicated otherwise.

#### 2.2 METAL CONDUIT

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  1. Allied Tube & Conduit, Harvey, IL (800) 882-5543.
  2. Wheatland Tube Co., Collinswood, NJ (800) 257-8182.
  3. Republic Wire & Cable, Rocky Mount, NC (800) 533-8198.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Rigid Galvanized Steel Conduit (GRC): ANSI C80.1, UL6.
- C. Intermediate Metal Conduit (IMC): UL1242.
- D. Fittings and Conduit Bodies: NEMA FB1 Material to match conduit.

#### 2.3 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  1. Hubbell, Millford, CT (203) 882-4800.
  2. Electriflex, Roselle, IL (800) 323-6174.
  3. O-Z/Gedney, Farmington, CT (860) 677-5541.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

- B. Description: Interlocked steel and aluminum construction.
- C. Fittings: NEMA FB 1.

#### 2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  1. Hubbell, Millford, CT (203) 882-4800.
  2. Electriflex, Roselle, IL (800) 323-6174.
  3. Anixter, Inc., Skokie, IL (800) ANIXTER.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Description: Interlocked steel and aluminum construction with PVC jacket.
- C. Fittings: NEMA FB 1.

#### 2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers: Subject to compliance with project requirements, manufacturers offering specified items which may be incorporated in the Work include the following:
  1. Allied Tube & Conduit, Harvey, IL (800) 882-5543.
  2. Wheatland Tube Co., Collinswood, NJ (800) 257-8182.
  3. Republic Wire & Cable, Rocky Mount, NC (800) 533-8198.
  4. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Description: ANSI C80.3; galvanized tubing.
- C. Fittings and Conduit Bodies: NEMA FB 1; steel set-screw type. Die-cut Zinc not permitted.

#### 2.6 NONMETALLIC CONDUIT

NOT USED

#### 2.7 FITTINGS

- A. Manufacturer: Raco, Inc., South Bend, IN (219) 234-7151.
  1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Steel City.
    - b. O-Z/Gedney.
  2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Conduits 1/2 inch thru 1 inch enter junction boxes, pull boxes, panels, cabinets, and gutters, provide the following:
  1. Rigid Conduit: Raco 1222, 1223, 1224.
  2. Flexible Metal Conduit: Raco 3302, 3303, 3304, 3305, 3306, 3308.
  3. Liquidtight Flexible Metal Conduit: Raco 3511, 3512, 3513, 3541, 3542, 3543.

- C. Conduits 1-1/4 inch and larger entering junction boxes, pull boxes, panels, cabinets, and gutters, provide Insulated throat type bushings; Raco 1225, 1226, 1228, 1230, 1232, 1234, 1236.
- D. Provide threaded joint connectors and malleable iron no thread compression box connectors on rigid conduit. Do not provide fittings requiring set screws or indentor type applications including BM connectors.
- E. Provide only steel set-screw couplings and connectors on EMT conduit.

## 2.8 CONDUIT STRAPS AND HANGERS

- A. Strap Manufacturer: Raco, Inc., South Bend, IN (219) 234-7151
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Steel City.
    - b. Unistrut.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Hanger Manufacturer: Steel City/Thomas & Betts, Memphis, TN (800) 888-0211.
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Unistrut.
    - b. Raco.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- C. Straps: Two hole push on stamped steel straps on surface areas such as concrete, masonry, wide flange beams, columns, and wood.
  - 1. Rigid Conduit: Raco 2232, 2233, 2234, 2235, 2336, 2238.
  - 2. Electrical Metallic Tubing: Raco 2092, 2093, 2094.
- D. Hangers: Lay-in pipe hanger.
  - 1. Conduits 1-1/4 Inch and Larger: Steel-City C-149.
- E. Trapeze Hangers for Conduits Grouped Together: Hangers consisting of all thread rods sized as required and Kingdorff channel.
  - 1. Steel City B-909, 1/2 inch x 1-7/8 inch (12 gauge) with single bolt channel pipe straps.
  - 2. Steel City C-105, C-105-AL, or C-106, (no wire permitted for anchoring conduit).

## 2.9 SEAL-OFF AND EXPANSION FITTINGS

- A. Expansion Fitting Manufacturer: OZ/Gedney, Farmington, CT (860) 677-5541
  - 1. Subject to compliance with project requirements, one of the following manufacturers may also be provided:
    - a. Crouse-Hinds.
    - b. Killark.
    - c. Appleton.
  - 2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
- B. Provide expansion fittings in conduits where indicated on Drawings or where required to pass through expansion joints embedded in concrete.
  - 1. O-Z/Gedney Type AX.

## 2.10 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
  - 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
  - 2. Receptacle and Device Boxes - 4 inch square x 2-1/8 inch deep with raised, single gang, plaster ring unless indicated otherwise.
  - 3. Switch Boxes: 2 inch x 4 inch x 2-1/8 inch deep, unless indicated otherwise.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.

## 2.11 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

## 2.12 CABLE TRAY

NOT USED

## 2.13 FLOOR BOXES

NOT USED

PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Verify routing and termination locations of conduit prior to rough-in.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

## 3.2 INSTALLATION - RACEWAYS

- A. Install in accordance with the following schedule, unless indicated otherwise on Drawings: Plastic flexible PVC conduit shall not be permitted. Flexible metal conduit shall be permitted for electrical power and security wiring only and not permitted for fire alarm cables. Intermediate grade rigid conduit permitted where indicated below.
  - 1. Above Suspended Ceilings: Galvanized or sheradized thick wall rigid steel (GRC), or intermediate grade rigid steel (IMC), or electrical metallic tubing (EMT).
  - 2. Metal Stud Walls: Galvanized or sheradized thick wall rigid steel (GRC), intermediate grade rigid steel (IMC), or electrical metallic tubing (EMT).

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3. Exposed Interior Areas: Galvanized or sheradized thick wall rigid steel (GRC), intermediate grade rigid steel (IMC), electrical metallic tubing (EMT).
  4. Exterior Locations: Galvanized or sheradized thick wall rigid steel (GRC).
- B. Install conduit in accordance with NECA "Standard of Installation."
  - C. Conduit routing indicated on Drawings are approximate locations unless dimensioned. Route parallel and perpendicular to building construction for complete wiring system regardless whether exposed or concealed.
  - D. Arrange supports to prevent misalignment during wiring installation.
  - E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
  - F. Group related conduits; support using conduit rack. Construct rack using approved steel channel and provide space on each rack for 25 percent additional conduits.
  - G. Fasten conduit supports to building structure and surfaces under provisions of this section.
  - H. Do not support conduit with wire or perforated pipe straps in any type structure. Remove wire used for temporary supports. Steel tie wire may be used to anchor conduit down to reinforcing rods in concrete encasement only.
  - I. Do not attach conduit or boxes to ceiling support wires. Boxes shall be independently supported.
  - J. Arrange conduit to maintain headroom and present neat appearance. Maintain required clearance between conduit and piping.
  - K. Route all conduit, whether exposed or concealed, parallel and perpendicular to walls, ceilings, building structures, etc.
  - L. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
  - M. Cut EMT conduit square using saw or pipecutter; de-burr cut ends and ream. Bring conduit to shoulder of fittings; fasten securely.
  - N. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes. Use myers hub connectors on all conduit entering top or sides of all junction boxes, pull boxes, wiring gutters, exposed to weather.
  - O. The number of conduit bends per box shall comply with NFPA 70, Article 360. Pull boxes shall be sized per NEC codes per conduit installed. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or use factory elbows for bends in metal conduit larger than 2 inch size.
  - P. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
  - Q. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
  - R. Provide suitable nylon pull string or #14 AWG steel wire in each conduit excluding sleeves and nipples.
  - S. Ground and bond conduit per NFPA 70.
  - T. Coat all metallic conduit with "General Electric" RTV silicone sealer where conduit is installed in exterior areas or in contact with concrete or earth.

- U. Conduits shall be sized as indicated on Drawings. Where sizes are not indicated, conduit shall be sized per NFPA 70.
- V. Cap all upturned conduits during construction rough-in to prevent moisture or debris from entering. Pull through each and every conduit a dry swab of sufficient size to remove any and all moisture.
- W. Maximum length of flexible metal conduit (Greenfield), or flexible liquidtight shall be 5 feet.
- X. Assure ground continuity on all branch circuitry conduits with two locknuts, one inside and one outside of all boxes, cabinets and gutters for rigid conduit. One locknut inside of all boxes, cabinets, and gutters for EMT.
- Y. Provide conduit supports as follows:
  1. Galvanized rigid thick wall conduit (GRC), intermediate grade rigid conduit (IMC) and electrical metallic conduit (EMT) within three feet of all outlet boxes, junction boxes, cabinets, gutters, or fittings. Horizontally anchored at 10 foot maximum intervals. Other spacings indicated on Drawings.
  2. Flexible metal conduit (Greenfield) and liquid-tight flexible metal conduit (sealtite), within 12 inches of all outlet boxes, junction boxes, cabinets, gutters, or fittings and bends or turns. Horizontally anchored at 4-1/2 foot intervals. 1/2 inch minimum size permitted.

### 3.3 INSTALLATION - BOXES

- A. Install boxes in accordance with NECA "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with NFPA 70.
- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated or as required for specific project requirements.
- D. Electrical boxes are indicated on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose with no additional cost to contract. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- E. Maintain headroom and present neat mechanical appearance.
- F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Install pull boxes in dock area above bottom chord of structural joist. Pullboxes sized in excess of 12 inches shall be equipped with hinged and hasped covers.
- G. Install outlet and junction boxes within inaccessible ceiling areas, no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- H. Locate outlet boxes to allow luminaires positioned as indicated on Drawings.
- I. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- J. Locate flush mounted box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening. Use approved raised gang covers in masonry and stud walls.
- K. Flush mounted boxes shall not be mounted back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- L. Secure flush mounted box to interior wall and partition studs. Accurately position to allow for surface finish thickness. Use approved stamped steel bridges to fasten box between studs.

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- M. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- N. Use approved adjustable steel channel fasteners spanning joist for hung ceiling outlet box.
- O. Provide factory sectioned multi-gang boxes where more than one adjacent device is to be mounted. Sectional boxes shall not be permitted.

#### 3.4 INSTALLATION - CABLE TRAYS

NOT USED

#### 3.5 FIELD QUALITY CONTROL

- A. Section 014000 – Quality Requirements: Field inspection.
- B. Inspect conduit installation, types, sizes, fittings and attachment to structure.
- C. Inspect box installation, locations, connection to conduit, and attachment to structure.

#### 3.6 ADJUSTING

- A. Adjust flush-mounting outlets to make front flush with finished wall material.
- B. Install knockout closures in unused box openings.

#### 3.7 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish like new.

END OF SECTION

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## SECTION 260800

## COMMISSIONING OF ELECTRICAL SYSTEMS

## PART 1 - GENERAL

## 1.1 WORK INCLUDED

- A. Systems and equipment testing and start-up.
- B. Validation of proper and thorough installation of Division 26 and Division 28 systems and equipment.
- C. Functional performance testing of electrical systems.
- D. Documentation of tests, procedures, and installations.
- E. Coordination of Training Events.
- F. Generic Start-Up Procedures for electrical systems and equipment.

## 1.2 SCOPE

- A. The following equipment and/or systems shall be commissioned if in compliance with the guidelines provided in Specification 019113, or with Contracting Officer approval:
  - 1. Fire Alarm System

## 1.3 GENERAL DESCRIPTION

- A. Commissioning (Cx) is the process of ensuring that all building systems are installed and perform interactively according to the design intent; that systems are efficient and cost effective and meet the USPS's operational needs; that the installation is adequately documented; and that the Operators are adequately trained. It serves as a tool to minimize post-occupancy operational problems. It establishes testing and communication protocols in an effort to advance the building systems from installation to full dynamic operation and optimization.
- B. The USPS shall retain an independent Commissioning Authority (CxA) to provide Commissioning Services through their preapproved vendors.
- C. Commissioning Authority (CxA) shall work with the Contractor and Engineer to direct and oversee the Cx process and perform functional performance testing.
- D. This Section outlines the Cx procedures specific to the Contractor's electrical responsibilities. Requirements common to all work are described in Specification Section 019113.

## 1.4 RELATED WORK AND DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section
- B. Commissioning Plan: The Cx Plan shall be available for reference as it outlines responsibilities outside of the Construction Contract. It provides the Contractor and the USPS an understanding of the planned commissioning activities for that project.

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- C. Section 013300 - Submittal Procedures: Stipulates additional copies of submittals to be submitted and refers to other sections for additional submittal requirements related to Cx.
- D. Section 017704 - Closeout Procedures and Training: Defines the milestones in completion incorporating the Cx process.
- E. Section 019113 – General Commissioning Requirements: Specifies the general facility commissioning procedures common across all Divisions and the Contractor’s responsibilities for the commissioning process.
- F. Individual Specification Sections: Individual sections stipulate installation, start-up, warranty, O&M documentation, and training requirements for the system or device specified in the Section.

## 1.5 REFERENCE STANDARDS

- A. AABC Commissioning Group (ACG)
- B. NEBB – Procedures for Building Systems Commissioning
- C. National Electric Code (NEC)
- D. American Society for Testing and Materials (ASTM)
- E. Electronics Industry Association/Telecommunications Industry Association (EIA/TIA)
- F. Illuminating Engineering Society (IES)
- G. Institute of Electrical and Electronics Engineers (IEEE)
- H. International Electrical Testing Association (NETA)
- I. National Electrical Manufacturers Associates (NEMA)
- J. National Fire Protection Association (NFPA)
- K. Underwriters Laboratory, Inc. (UL)

## 1.6 RELATED WORK AND DOCUMENTATION

- A. As required in Specification 019113 and the following as they apply to the commissioning of equipment:
  - 1. Factory Test Reports: Contractor shall provide any factory testing documentation or certified test reports required by the specifications. These shall be provided prior to Acceptance Phase. Factory Test Reports should be provided in pdf electronic format. These include but are not limited to:
    - a. Field Testing Agency Reports: Provide all documentation of work done by independent testing agencies required by the contract documents. These shall be provided prior to Acceptance Phase. Field Testing Agency Reports should be provided in pdf electronic format.

## 1.7 COORDINATION MANAGEMENT PROTOCOLS

- A. Coordination responsibilities and management protocols relative to Cx are initially defined in Section 019113 and the Commissioning Plan, but shall be refined and documented in the Construction Phase Cx Kick-Off meeting. Contractor shall have input in the protocols and all Parties will commit to scheduling obligations. The CxA will record and distribute.

## 1.8 CONTRACTOR RESPONSIBILITIES

- A. Refer to Section 019113: Detailed Contractor responsibilities common to all Divisions are specified in Section 019113. The following are additional responsibilities or notable responsibilities specific to the electrical systems.
- B. Construction Phase
  - 1. Coordinate the work of the Electrical Testing Agency and the Cx requirements, as required.
  - 2. Provide skilled technicians qualified to perform the work required.
  - 3. Provide factory-trained and authorized technicians where required by the Contract Documents.
  - 4. Prepare and submit required draft Start-Up Procedures and submit along with the manufacturer's application, installation and start-up information.
  - 5. Provide assistance to the CxA in preparation of the specific Functional Performance Test (FPT) procedures. Contractors, subcontractors and vendors shall review FPT procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
  - 6. Thoroughly complete and inspect installation of systems and equipment as detailed throughout Contract Documents, as required by reference or industry standards, and as specifically indicated elsewhere this Section.
  - 7. Record Start-up Procedures on start-up procedure forms and certify that the systems and equipment have been started and or tested in accordance with the requirements specified above. Each task or item shall be indicated with the Party actually performing the task or procedure.
- C. Acceptance Phase
  - 1. Assist CxA in functional performance testing. Assistance will generally include the following:
    - a. Manipulate systems and equipment to facilitate testing.
- D. Warranty Phase
  - 1. Maintain record documentation of any configurations, set ups, parameters etc, that change throughout the period.
    - a. Provide representative for off season testing as required by CxA.
    - b. Respond to Warranty issues as required by Division 1 and the General Conditions.

## 1.9 START-UP PROCEDURES AND DOCUMENTATION

- A. Refer to Section 019113 and as detailed in Part 3 – Execution.

## 1.10 INDEPENDENT ELECTRICAL TESTING AGENCY

- A. The Independent Electrical Testing Agency shall be provided under the construction specifications and therefore included with the bid. Many of the aspects of the start-up and functional performance testing indicated herein will be accomplished under the respective section and witnessed by the CxA at the indicated sample rate. CxA will include applicable test results in the functional performance testing record.

### 1.11 FUNCTIONAL PERFORMANCE TESTING

- A. For applicable systems and equipment, Contractor shall participate in the initial samples of Functional Performance Testing as stipulated in Section 019113 and the Commissioning Plan.

### 1.12 FPT ACCEPTANCE CRITERIA

- A. Acceptance criteria for tests are indicated in the specification Sections applicable to the systems being tested. Generally, unless indicated otherwise, the criteria for acceptance will be that specified with the individual system, equipment, component, or device, which in general conform to NFPA 70B and International Electrical Testing Association (NETA) testing specifications NETA ATS-2003.

### 1.13 TRAINING

- A. Contractors, subcontractor, vendors, and other applicable Parties shall prepare and conduct training sessions on the installed systems and equipment they are responsible for per the requirements of Section 019113 and the individual Specifications.

### 1.14 O&M MANUAL CONTENT - PREPARATION AND LOGISTICS

- A. Refer to Section 019113 and the individual Specifications.

## PART 2 - PRODUCTS

### 2.1 INSTRUMENTATION

- A. All testing equipment used by any Party shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply: All equipment shall be calibrated according to the manufacturer's recommended intervals. Calibration tags shall be affixed or certificates readily available.
- B. Testing Instrumentation: Contractor shall provide all instrumentation necessary for tests for which they are responsible. CxA will provide standard instrumentation for measuring medium and low voltage electrical voltage, current, power factor, power, and THD. CxA will provide receptacle testers for normal and GFI receptacle tests. Contractor shall provide all other instrumentation required to accomplish the specified testing.
- C. Contractor shall provide infrared scanning equipment when required by the contract documents. Infrared scanning equipment shall be an AGA (or approved equal) thermovision set capable of viewing an entire bus or equipment assembly at one time and have a sensitivity of 0.2 degree C with a liquid nitrogen reference.
- D. Contractor shall provide Amprobe DM-III Multitest F power quality recorder/data logger or approved equal.

## PART 3 - EXECUTION

## 3.1 START-UP PROCEDURES

- A. This Section outlines 'generic' or minimally acceptable Start-Up Procedures. These items shall provide a minimum or guideline for required Contractor development of Start-Up Procedures. Contractor shall synthesize these minimum requirements along with their own internal quality control practices, those of the manufacturer, and any applicable codes and standards to develop specific and itemized Start-Up Procedures specific to the equipment and systems installed on this project.
- B. Refer to NETA which is referenced in several Division 26 sections which outline electrical related testing required.
- C. The following start up verifications/procedures are common to all systems
  - 1. Checkout shall proceed from devices to the components to the systems.
  - 2. Verify labeling is affixed per spec and visible
  - 3. Verify prerequisite procedures are done.
  - 4. Inspect for damage and ensure none is present.
  - 5. Verify system is applied per the manufacturer's recommendations
  - 6. Verify system has been started up per the manufacturer's recommendations
  - 7. Verify that access is provided for inspection, operation and repair
  - 8. Verify that access is provided for replacement of the equipment
  - 9. Verify the record drawings, submittal data and O&M documentation accurately reflect the installed systems
  - 10. Verify all gages and test reports are provided as required by contract documents and manufacturer's recommendations
  - 11. Verify all recorded nameplate data is accurate
  - 12. Installation is done to ensure safe operation and maintenance.
  - 13. Verify specified replacement material/attic stock has been provided as required by the Construction Documents
  - 14. Verify all rotating parts are properly lubricated
  - 15. Verify all monitoring and ensure all alarms are active and set per USPS's requirements

## 3.2 LIGHTING AND LIGHTING CONTROLS

NOT USED

END OF SECTION

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## SECTION 283100

## FIRE DETECTION AND ALARM

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This specification provides the minimum requirements for the Life Safety System. The system shall include, but not limited to all equipment, materials, labor, documentation and services necessary to furnish and install a complete, operational system to include but not limited to the following functions:
  - 1. Protected premises fire alarm systems.
  - 2. Initiating devices.
  - 3. Notification appliances.
  - 4. Inspection and testing.
  - 5. Auxiliary fire alarm equipment.
- B. Related Sections:
  - 1. Section 260500 - Common Work Results for Electrical.
  - 2. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
  - 3. Section 260533 – Raceway & Boxes for Electrical Systems.
  - 4. Section 260800 – Commissioning of Electrical Systems.

## 1.2 REFERENCES

- A. All work and materials shall conform to all applicable federal, state and local codes and regulations governing the installation. The equipment and installation shall comply with the current provisions of the following codes and standards.
- B. American National Standards Institute (ANSI):
  - 1. ANSI S3.411, Audible Emergency Evacuation Signals.
  - 2. ANSI/UL 1971, Standard for Safety Signaling devices for Hearing Impaired.
- C. National Fire Protection Association (NFPA):
  - 1. NFPA 13, Installation of Sprinkler Systems.
  - 2. NFPA 20, Installation of Centrifugal Fire Pumps
  - 3. NFPA 70, National Electrical Code.
  - 4. NFPA 72, National Fire Alarm Code.
  - 5. NFPA 101, Life Safety Code.
- D. Underwriters Laboratories, Inc.(UL):
  - 1. UL 864 - Control Units for Fire Protective Signaling Systems.
  - 2. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
  - 3. UL 268A - Smoke Detectors for Duct Applications.
  - 4. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
  - 5. UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.
  - 6. UL 464 - Audible Signaling Appliances.
  - 7. UL 38 - Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems.
  - 8. UL 346 - Waterflow Indicators for Fire Protective Signaling Systems.
  - 9. UL 1971 - Signaling Devices for the Hearing-Impaired.
  - 10. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
  - 11. UL 1635 - Digital Alarm Communicator System Units.

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- E. Federal Codes and Regulations
  - 1. Americans with Disabilities Act (ADA)
- F. International Standards Organization (ISO)
  - 1. ISO-9000
  - 2. ISO-9001
- G. Factory Mutual (FM)
  - 1. Provide factory mutual approval.

### 1.3 DEFINITIONS:

- A. Authority Having Jurisdiction: See Public Authorities.
- B. Engineer of Record: A Professional Engineer Registered in the State where the project is located who undertakes design of the fire protection system.
- C. Owner: Building/facility owner, landlord/lessor, tenant/lessee, Insurance Carrier or any designated representative of these entities.
- D. Public Authorities: Local, State or Federal government body having jurisdiction over any portion of the project. This includes, but is not limited to: Fire Departments, Fire Marshal Offices, Aviation Authorities, Insurance Regulatory Boards, etc.

### 1.4 SYSTEM DESCRIPTION

- A. General
  - 1. The Contractor shall furnish all labor, services and materials necessary to furnish and install a complete, functional protected premises fire alarm system (System). The System shall comply in all respects with the requirements of the specifications, manufacturer's recommendations and Underwriters Laboratories Inc. (ULI) listings.
  - 2. Certification that the entire system(s) has/have been inspected and tested, is/are installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and ULI listings, and is/are in proper working order. Contractor shall use "Fire Alarm System Certification and Description" as required by NFPA 72.
- B. 24VDC NACs
  - 1. Provide and install a new fire detection and alarm system that shall consist of:
    - a. Fire Alarm Control Panel.
    - b. LCD remote annunciator(s).
    - c. A system printer.
    - d. Manual pull stations.
    - e. Area smoke detectors.
    - f. Area heat detectors.
    - g. Duct smoke detectors.
    - h. Sprinkler system waterflow(s) and valve supervisory switch(s).
    - i. Interface with suppression and ancillary shutdown system(s).
    - j. Audible notification appliances.
    - k. Synchronized visual notification appliances.
    - l. Magnetic door holders.
    - m. Provide elevator recall functions for primary and alternate floors and elevator power shunt trip activation.
    - n. Connection to City of Boston Fire Department via an existing Master Box.

## 1.5 SEQUENCE OF OPERATIONS

### A. General 24 VDC NACs

1. The alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler waterflow, the following functions shall automatically occur:
  - a. The internal audible device shall sound at the control panel and remote annunciator.
  - b. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
  - c. All system activity/events shall be documented in system history and on the system printer.
  - d. Any remote or local annunciator LCD/LED's associated with the alarm shall be illuminated.
  - e. Activate notification audible appliances throughout the building.
  - f. Activate visual strobes notification appliances throughout the building. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
  - g. Transmit an alarm signal to the Boston Fire Department.
  - h. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
  - i. All exit doors shall unlock throughout the building.
  - j. All self-closing fire/smoke doors held open shall be released.
  - k. Transmit an alarm signal to the central station.

### B. Duct Smoke Operation

1. The Alarm activation of any duct smoke detector, the following functions shall automatically occur:
  - a. The internal audible device shall sound at the control panel and remote annunciator.
  - b. The LCD display shall indicate all applicable information associated with the alarm condition including; device type, device location and time/date.
  - c. All system activity/events shall be recorded on the system printer and system history file.
  - d. Any remote or local annunciator LED's associated with the alarm shall be illuminated.
  - e. Transmit a supervisory signal to the central station.
  - f. Shutdown the local air handling unit.
  - g. All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

### C. Supervisory Operation

1. Upon supervisory activation of any sprinkler valve supervisory switch, the following functions shall automatically occur:
  - a. The internal audible device shall sound at the control panel and remote annunciator.
  - b. The LCD display shall indicate all applicable information associated with the supervisory condition including; device type, device location and time/date.
  - c. All system activity/events shall be documented on the system printer and system history file.
  - d. Any remote or local annunciator LCD/LED's associated with the supervisory activation shall be illuminated.

### D. Trouble Operation

1. Upon activation of a trouble condition or signal from any device on the system, the following functions shall automatically occur:
  - a. The internal audible device shall sound at the control panel and remote annunciator.
  - b. The LCD display shall indicate all applicable information associated with the trouble condition including; device type, device location and time/date.
  - c. All system activity/events shall be documented on the system printer and system history file.
  - d. Any remote or local annunciator LCD/LED's associated with the trouble zone shall be illuminated.

## 1.6 SYSTEM CONFIGURATION

## A. General

1. All Life Safety System equipment shall be arranged and programmed to provide a system for the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.
2. The System shall utilize independently addressed, smoke detectors, heat detectors and input/output modules as described elsewhere in this specification.

## B. Power Supply

1. The power supply shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 4.5A continuous for notification appliance circuits. All outputs shall be power limited. The battery shall be sized to support the system for 60 hours of supervisory and trouble signal current plus general alarm for 10 minutes.
2. Auxiliary power supplies shall be a high efficiency switch mode type with line monitoring to automatically switch to batteries for power failure or brown out conditions. The automatic battery charger shall have low battery discharge protection. The power supply shall provide internal power and 24 Vdc at 6.4 continuous for notification appliance circuits. The power supply shall be capable of providing 8A to output circuits for a maximum period of 100 ms. All outputs shall be power limited. The battery shall be sized to support the system for 60 hours of supervisory and trouble signal current plus general alarm for 10 minutes. All supervision of the auxiliary supply shall be transmitted via addressable analog loop without additional equipment.

## C. Display

1. The display module shall be of membrane style construction with a 4 line by 20 character Liquid Crystal Display. The LCD shall use super-twist technology and backlighting for high contrast visual clarity. In the normal mode display the time, the total number of active events and the total number of disable points. In the alarm mode display the total number of events and the type of event on display. Reserve 40 characters of display space for user custom messages. The module shall have visual indicators for the following common control functions; AC Power, alarm, supervisory, monitor, trouble, disable, ground fault, CPU fail, and test. There shall be common control keys and visual indicators for; reset, alarm silence, trouble silence, drill, and one custom programmable key/indicator. Provide four pairs of display control keys for selection of event display by type (alarm, supervisory, monitor and trouble) and forward / backward scrolling through event listings. The operation of these keys shall be integrated with the related common control indicator that lights when an event of its type is active. Allow the first event of the highest priority to capture the LCD for display so that arriving fire fighters can view the first alarm event "hands free". Provide system function keys; status, reports, enable, disable, activate, restore, program, and test. The module shall have a numeric keypad, zero through nine with delete and enter keys.

## D. Initiating Device Circuits

1. The Initiating device circuits (IDC) used to monitor manual fire alarm stations, smoke and heat detectors, waterflow switches, valve supervisory switches, fire pump functions, and air pressure supervisory switches shall be Class A.

## E. 24 VDC Notification Appliance Circuits

1. 24 VDC Notification appliance circuits (NAC) shall be Class A. All notification appliance circuits shall have a minimum circuit output rating of 2 amp @ 24 vdc. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.

- F. Audio Notification Appliance Circuits
  - 1. One-way audio notification appliance circuits (NAC) shall be Class A. All notification appliance circuits shall have a minimum circuit output rating of 35W @70Vrms. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
- G. Signaling Line Circuits (SLC-Data Circuits)
  - 1. The signaling line circuit shall communicate from a panel/node to analog/addressable detectors, input modules, output modules, isolation modules and notification appliance circuits.
  - 2. Each signaling circuit connected to addressable/analog devices shall provide a minimum of 20 spare addresses.
  - 3. When a signaling line circuit covers more than one fire/smoke compartments, a wire-to-wire short shall not effect the operation of the circuit from the other fire/smoke compartments.
  - 4. The signaling line circuit (SLC) connecting all components Class A (style 4).
- H. DACT
  - 1. The panel shall contain a dialer (alarm communicator transmitter (DACT)) module to transmit alarm, supervisory and trouble signals to a Central Monitoring Station (CMS). The DACT shall support dual telephones lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program using a touch tone phone and password.

## 1.7 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Procedures for submittals.
  - 1. Product Data:
    - a. Provide electrical characteristics and connection requirements.
    - b. Power and battery calculation.
  - 2. Shop Drawings: Provide graphic annunciator layout and system wiring diagram showing each device and wiring connection required. Prior to commencement of installation, submit licensed Professional Engineer's system drawings (signed and sealed by Delegated Engineer) specified in "Quality Assurance" Article to Designated Reviewers. Include system calculations and equipment data. Submittals shall be complete and in bound sets. System drawings, prepared according to Contract Documents. Submittals shall be made to Designated reviewers. Designated Reviewers are:
    - a. Additional Submittal: Submit shop drawings, product data, and calculations to Public Authorities for approval. Submit proof of approval to Contracting Officer.
    - b. Submittals to Contracting Officer:
    - c. Submittals to Engineer of Record:
  - 3. Assurance/Control Submittals:
    - a. Design Data: System operation description indicating method of operation and supervision of each component and each type of circuit, and sequence of operations for all manually and automatically initiated system inputs for this specific Project. Manufacturer's standard descriptions for generic systems not permitted.
    - b. Test Reports: Submit the following reports directly to Contracting Officer from Manufacturer's Quality Control Inspector, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements:
      - 1) Pre-test.
      - 2) Acceptance test.
    - c. Certificates: Manufacturer's certificate certifying that components and Products meet or exceed specified requirements.
    - d. Qualification Documentation:
      - 1) Submit documentation of manufacturer and installer experience indicating compliance with specified qualification requirements. Include lists of completed projects with project names and addresses, and names of Engineers and Owners.

- 2) Fire alarm contractor license issued by State or local authority having jurisdiction.
  - e. Manufacturer's Field Reports: Submit the following reports directly to A/E from Manufacturer's Quality Control Inspector, with copy to Contractor. Prepare reports in conformance with Section 014000 - Quality Requirements.
    - 1) Preparatory inspection.
    - 2) Initial inspection.
    - 3) Follow-up inspection.
    - 4) Final inspection.
  - f. All drawings shall be reviewed and signed off by an individual having a minimum of a NICET certification in fire protection engineering technology, subfield of fire alarm systems.
  - g. A copy of the installing technician's NICET certification shall be provided.
  - h. System Calculations: Complete calculations shall be provided which show the electrical load on the following system components:
    - 1) Each system power supply, including stand alone booster supplies.
    - 2) Each standby power supply (batteries).
    - 3) Each notification appliance circuit.
    - 4) Each auxiliary control circuit that draws power from any system power supply.
- B. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
- 1. Operation and Maintenance Data: Project specific operating manuals covering the installed Life Safety System. A generic or typical owner's instruction and operation manual shall not be acceptable to fulfill this requirement. Include user's software data and recommendations for spare parts to be stocked at the site. Provide names, addresses, and telephone numbers of service organizations that stock repair parts for the system.
  - 2. Project Record Documents: As-Built drawings consisting of: a scaled plan of each building showing the placement of each individual item of the Life Safety System equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway. All drawings must reflect point to point wiring, device address and programmed characteristics. All drawings shall be provided in AutoCad format. A vellum plot of each sheet shall also be provided. Provide the application program listing for the system as installed at the time of acceptance (disk, hard copy printout, and all required passwords).
  - 3. Record of Completion: Figure 4.5.2.1 NFPA 72.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm experienced in manufacturing equipment of the types and capacities indicated that have record of successful in-service performance with minimum 10 years documented experience. Prime system manufacturer and manufacturers of major system components required to qualify separately.
- 1. Service Center: The System Supplier shall maintain a service organization with adequate spare parts stock within 75 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor.
- B. Installer Qualifications: Experience with systems of the type and scope indicated and certified as authorized service representative of the prime system manufacturer with minimum 5 years documented experience.
- 1. System shall be installed by a single contractor that assumes responsibility for system components and their compatibility.
  - 2. Only manufacturer's certified installers with NICET Level III or higher shall be utilized.
- C. Regulatory Requirements:
- 1. Calculations, Product Data, Shop Drawings: Provide stamp of approval from Public Authorities.
  - 2. Comply with requirements of Public Authorities for submittals, approvals, materials, installation, inspections, and testing.

3. Comply with requirements of Contracting Officer and Owner's insurance underwriter for submittals, approvals, materials, installation, inspections, and testing.
4. Provide certificate of compliance from Public Authorities indicating approval of field acceptance tests.
5. Conform to applicable code for submission of design and calculations, reviewed shop and erection drawings and as required for acquiring permits.
6. Cooperate with regulatory agency or authority and provide data as requested.

D. Pre-Installation Meetings:

1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
2. Require attendance of parties directly affecting Work of this Section.
3. Review conditions of operations, procedures and coordination with related Work.
4. Agenda:
  - a. Tour, inspect, and discuss conditions of building and building structure.
  - b. Review system design and requirements.
  - c. Review required submittals, both completed and yet to be completed.
  - d. Review system Drawings and data.
  - e. Review and finalize construction schedule related to system and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
  - f. Review required inspections, testing, certifying, and material usage accounting procedures.

## 1.9 POSITIVE ALARM SEQUENCE

- A. Positive Alarm Sequence: If permitted by the public authority, the fire alarm system shall be equipped with positive alarm sequence feature (per NFPA 72, 9.6.3.4) that allows initial fire alarm signals to be received at the constantly attended control panel location and for which human action is subsequently required to delay the general alarm by 180 seconds after the start of the alarm processing. The transmission of the alarm signal to the central station shall activate upon the initial alarm signal.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. All equipment and components shall be the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- B. Subject to compliance with project requirements, manufacturers offering Products which may be incorporated in the Work include the following:
1. UTC Fire and Security/Edward Systems Technologies, Inc. (EST), (800) 655-4497. Rep. R.B. Allen Co. 603-964-8140.
  2. Siemens, 800-262-7976.
  3. Honeywell/Notifier, 973- 455-2000.
  4. Simplex/Grinnell, 978-731-2500
- C. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted subject to approval of Contracting Officer.
1. Conflicts, deviations, or change requests shall be submitted in writing to Contracting Officer with supporting documentation. Include written justification, designs, manufacturer's specifications, cost benefits, and any special circumstances dictated by local conditions. Documentation package shall be submitted in sufficient time to minimize any adverse effects of the proposed

changes to the project construction schedule. Contracting Officer reserves the right to reject substitute and other systems.

## 2.2 PANEL COMPONENTS AND FUNCTIONS

### A. General

1. The control panel(s) shall be a multi-processor-based system designed specifically for fire and releasing system applications. The control panel shall be listed and approved for the application standard(s) as listed under the General section.
2. The control panel(s) shall include all required hardware, software and system programming to provide a complete and operational system. The control panel(s) shall assure that life safety takes precedence among all panel activities.
3. The control panel(s) shall include the following capacities:
  - a. Support up to 380 analog/addressable points per panel (1,900 total with 5 networked panels)
  - b. Support up to 5 fully supervised network remote annunciators.
  - c. Support a DACT (dialer) for off premise notification
  - d. Support up to 576 chronological events in history.
4. The control panel(s) shall include the following features:
  - a. Provide autoprogramming and electronic addressing and mapping of analog/addressable devices.
  - b. Provide an operator interface display that shall include functions required for annunciation, command and control system functions.
  - c. Provide a discreet system control switch provided for reset, alarm silence, local silence, drill switch, up/down switches, status switch, program switch, enable and disable switches, activate and restore switches, reports switch and test switch.
  - d. Provide system reports that provide sensitivity and history details.
  - e. Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords; and autoprogram, enable mapping, restart the system and clear control panel event history file.
  - f. Provide an authorized operator to perform test functions within the installed system.
5. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel(s). Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure. Control Panel:
6. Basis of Design: EST, EST/3 Network Series.

### B. Annunciation

1. The system shall be designed and equipped to receive, monitor, and annunciate signals from devices and circuits installed throughout the building. Manufacturer's standard control switches shall be acceptable if they provide the required operation, including performance, supervision and position indication. If the manufacturers' standard switches do not comply with these requirements, fabrication of custom manual controls acceptable to the contracting officer is required.
2. Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control panel(s) and at each remote annunciator panel.
3. The control panel(s) and remote annunciator(s) shall contain the following system status indicators:
  - a. 80 character Backlit Liquid Crystal Display.
  - b. System Power Indicator - green LED.
  - c. System Common Alarm - red LED.
  - d. System Common Trouble - yellow LED.
  - e. System Common Supervisory - yellow LED.



- f. System Common Monitor - yellow LED.
  - g. System Ground Fault - yellow LED.
  - h. System CPU Fault - yellow LED.
  - i. System Disabled - yellow LED.
  - j. System Test Point(s) - yellow LED.
  - k. System Reset Switch with Integral yellow LED.
  - l. System Alarm Silence Switch with Integral yellow LED.
  - m. System Local Silence Switch with Integral yellow LED.
  - n. System Drill Switch with Integral yellow LED
  - o. System Message Queue Scroll Switches.
  - p. Additional buttons as required to provide system control and operator functions.
4. Basis of Design: EST EST/3 Network Series.

C. Power Supply

- 1. Each system power supply shall be a minimum of 6 amps @ 24 vdc.
- 2. Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any alarm, trouble or operator acknowledgment signals.
- 3. Each system power supply shall be individually annunciated and shall identify the inoperable power supply in the event of a trouble condition.
- 4. All standby batteries shall be continuously monitored by the system. Low battery and disconnection of battery power supply conditions shall immediately annunciate as a trouble signal, identifying the deficient batteries.
- 5. All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours maximum.
- 6. All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of Section 4.4.1.4 of NFPA 72. The AC power circuit shall be installed in conduit raceway. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside the each control panel.
- 7. Basis of Design: EST model 3-PPS/M.

D. Display

- 1. System Message Processing and Display Operations:
  - a. The system shall allow message routing to be configured to any or all annunciators.
  - b. All system printer port(s) shall be configurable to output any combination of alarm, supervisory, trouble, or monitor, event messages.
  - c. Each LCD display on each annunciator shall be configurable to display the status of any combination of alarm, supervisory, trouble, or monitor, event messages.
  - d. Clear distinction shall be provided between alarm, supervisory, trouble, and monitor status messages.
- 2. The system shall provide the ability to retrieve data from the analog/addressable detectors to a PC while the system is on-line and operational in the protected premises. The uploaded data may then be analyzed in a diagnostic program supplied by the system manufacturer.
- 3. A standby power supply shall automatically supply electrical energy to the system upon primary power supply failure

E. Dialer -- DACT

- 1. The system shall provide an off premise Digital Alarm Communications Transmitter (DACT) capable of transmitting system alarm, trouble and supervisory events to a central monitoring station (CMS). The DACT shall support dual telephone lines, 20 PPS 4/2 communications, and configured for dual tone multi-frequency (DTMF) or pulse modes. It shall be possible to delay AC power failure reports, auto test call, and site program the DACT using a touch-tone phone and password.
- 2. Basis of Design: EST model 3 MOD COM.

## F. One-Way Emergency Audio Communications

1. A supervised one-way dual-channel emergency communications system shall be provided in the main control panel located within the Postal Police office. The main one-way audio controller shall provide a push-to-talk microphone with coiled cord, and switches that allow the emergency user to page to the evacuation channel, page to the alert channel or quickly place evacuation or alert tones on the selected channels. Switches shall also be provided to permit paging on the evacuation or alert channel using the firefighters telephone system as the paging source.
2. Each channel shall have the capability to output a different tone or prerecorded message independent of each other. Each supervised branch audio circuit shall provide a connect/disconnect switch and indicators for active circuit selection and circuit trouble.
3. Basis of Design: One-way emergency audio communications module EST model 2-MIC/2-AAC; pre-recorded digital message unit EST model 3-ASU/4.

## G. One-Way Emergency Audio Amplifiers

1. The One-Way amplifiers shall be high-efficiency switch-mode audio amplifiers. Each amplifier must support dual channel audio. The audio output shall be configurable as 25VRMS or 70VRMS in Class A wiring, rated at 40 or 95 watts. The amplifiers shall support speakers connected directly to the output of the amplifier or the amplifier output shall be capable of being run as an audio riser to switching modules where speaker zone selection is made.
2. Each amplifier shall have a built in back up 1kHz tone generator that automatically activates with loss of input signal. Each amplifier shall have provision for a back up amplifier. It shall be possible to default to back up tone or standby amplifier in the event of the loss of input signals. System remote amplifiers must communicate their status directly to the main control panel. External monitoring is not acceptable. Onboard status LEDs shall be provided for quick visual indication of amplifier status
3. Basis of Design: EST model 3-A40 or 3-ZA95 watt amplifiers.

## H. System Printer

1. The event and status printer shall be a 9-pin, impact, dot matrix printer with a minimum print speed of 232 characters per second. The printer shall be capable of serial communications protocol. The printer shall list the time, date, type and user defined message for each event printed.
2. Basis of Design: EST model PT-1S.

## I. Pager Interface

1. The system shall provide a module capable of transmitting alphanumeric system activity, by event, to a commercial paging system using TAP pager protocol. The system module shall be equipped with a high speed (V.32BIS or greater 14.4Kbaud) modem.
2. Basis of Design: EST model API-8/232ME

## J. Reports

1. The system shall provide the operator with system reports that give detailed chronological description of the last 576 system events. The system shall provide a report that gives a listing of the sensitivity and environmental compensation usage of all of the detectors on the system, or specified analog/addressable circuit.
2. The system report shall also include facility name, compiled date, compiler revision, project revision and report date. The system shall output these reports via the main LCD, and reports shall be capable of being printed on the system printer.

## 2.3 FIELD-MOUNTED SYSTEM COMPONENTS

### A. Smoke Detectors and Accessories

1. Analog Addressable Smoke General
  - a. Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive.
  - b. An alternate alarm sensitivity level shall be provided for each detector, which can be set to any of the five (5) sensitivity settings manually or automatically using a time of day event.
  - c. The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance alert signal that 80% to 99% compensation has been used. The detector shall provide a dirty fault signal that 100% compensation has been used.
  - d. The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.
2. Smoke Detector - Multi-Sensor Photo Thermal (Ceiling Mounted)
  - a. Provide analog/addressable multisensor combination photoelectric, thermal smoke detectors for all ceiling mounted locations. Alarm condition shall be based upon the combined input from the photoelectric and thermal detection elements. Separately mounted photoelectric detectors and heat detectors in the same location, clustered at the manufacturer's listed spacing is not an acceptable alternative. The system shall have the ability to set the sensitivity and alarm verification of each individual detector on the circuit. It shall be possible to automatically set the sensitivity of individual analog/addressable detectors for the day and night periods.
  - b. Each smoke detector shall be capable of transmitting alarm signals as well as normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value.
  - c. Basis of Design: EST model SIGA2-PHS
3. Smoke Detector - Photoelectric (Duct Mounted)
  - a. Provide analog/addressable photoelectric smoke detectors at all duct applications. The system shall have the ability to set the sensitivity and alarm verification of each of the individual detectors on the circuit. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. Each smoke detector shall be capable of transmitting alarm signals as well as normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 80% and 100% of the allowable environmental compensation value.
  - b. Provide key operated "normal-reset-test" switch at each duct smoke detector.
  - c. Basis of Design: EST model SIGA2-PS.

4. Duct Detector Mounting Plate
    - a. Where smoke detectors are directly inserted into a low velocity ducts 3 ft (0.91m) high x 3 ft (0.91m) wide, ceiling plenums, or raised floors, provide factory supplied mounting plate assemblies to facilitate mounting the detectors. The mounting plate shall be code gauge steel with corrosion resistant red enamel finish. The detector mounting plate shall support an analog/addressable detector along with a standard, relay or isolator detector-mounting base.
    - b. Basis of Design: EST model SIGA-SD.
  5. Duct Detector Housing
    - a. Provide smoke detector duct housing assemblies to mount an analog/addressable detector along with a standard, relay or isolator detector mounting base. The housing shall also protect the measuring chamber from damage and insects. The housing shall utilize an air exhaust tube and an air sampling inlet tube that extends into the duct air stream up to ten feet. Drilling templates and gaskets to facilitate locating and mounting the housing shall also be provided. The housing shall be finished in baked red enamel. Remote alarm LED indicators and remote test stations shall be provided.
    - b. Basis of Design: EST model SIGA-SD.
- B. Heat Detectors
1. Fixed Temperature Heat Detector (Equipment Rooms)
    - a. Provide analog/addressable fixed temperature heat detectors within all equipment rooms. The heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C). The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.
    - b. Basis of Design: EST model SIGA2-HFS.
  2. Fixed Temperature-ROR Heat Detector (Ceiling Mounted)
    - a. Provide analog/addressable combination fixed temperature / rate-of-rise detectors for all ceiling mounted locations. The heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate of rise alarm point of 15°F(9°C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.
    - b. Basis of Design: EST model SIGA2-HRS..
- C. Detector Bases
1. Detector Base - Standard
    - a. Provide detector mounting base suitable for mounting on single gang, 3½ or 4 inch octagon box or 4 inch square box. The base shall, contain no electronics and support all series detector types.
    - b. Basis of Design: EST model SIGA-SB.
  2. Detector Base - Relay
    - a. Provide relay detector mounting base suitable for mounting on single gang, 3½ or 4 inch octagon box and 4 inch square box. The relay base shall support all detector types and have the following minimal requirements.
    - b. The relay shall be a bi-stable type and selectable for normally open or normally closed operation.
      - 1) The position of the contact shall be supervised.
      - 2) The relay shall automatically de-energize when a detector is removed.
      - 3) The operation of the relay base shall be controlled by its respective detector processor. Detectors operating standalone mode shall operate the relay upon changing to alarm state. Relay bases not controlled by the detector microprocessor shall not be acceptable.
      - 4) Form "C" Relay contacts shall have a minimum rating of 1 amp @ 30 Vdc and be listed for pilot duty.
      - 5) Removal of the respective detector shall not affect communications with other detectors.
    - c. Basis of Design: EST model SIGA-RB

## D. Manual Stations

## 1. Manual Station - Double Action Single Stage

- a. Provide analog/addressable double action, single stage fire alarm stations at the locations shown on the drawings. The fire alarm station shall be of polycarbonate construction and incorporate an internal toggle switch. A locked test feature shall be provided. The station shall be finished in red with silver "PULL IN CASE OF FIRE" lettering. The manual station shall be suitable for mounting on 2 ½ (64mm) deep single gang boxes and 1 ½ (38mm) deep 4 square boxes with single gang covers.
- b. Provide factory manufactured boxes for all surface mounted applications.
- c. Basis of Design: EST model SIGA-278

## E. Notification Appliances

## 1. General

- a. All appliances which are supplied for the requirements of this specification shall be UL Listed for Fire Protective Service, and shall be capable of providing the "equivalent facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA(AG)), and shall be UL 1971 Listed.
- b. All appliances shall be of the same manufacturer as the fire alarm control panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturer's instructions.
- c. All notification appliances shall be red unless noted otherwise on the drawings.

## 2. Heavy Duty Horns (Exterior Locations)

- a. Provide heavy duty electronic horns for exterior locations. Horns shall be selectable for high or low dBA output and steady or temporal output. At the high output setting, the horn shall provide a 85 dBA continuous sound output or a 82 dBA temporal sound output, when measured in reverberation room per UL-464. In and out screw terminals shall be provided for wiring. Weatherproof wall boxes shall be provided for outdoor applications.
- b. Basis of Design: EST Integrity series.

## 3. Low Profile Speaker (Interior Locations)

- a. Provide low profile wall mount speakers within interior locations. The low profile speaker shall not extend more than 1" (2.5cm) past the finished wall surface, and provide a switch selectable audible output of 2W (90dBA), 1W (87dBA), 1/2W (84dBA), or 1/4W (81dBA) at 10 ft. when measured in reverberation room per UL-464.
- b. Wattage setting shall be visible with the cover installed. When the cover is installed, no mounting hardware shall be visible. In and out screw terminals shall be provided for all wiring. The low profile speaker shall mount in a 4" x 2 1/8" square electrical box, without trims or extension rings.
- c. Provide factory manufactured boxes for all surface mounted applications.
- d. Basis of Design: EST Genesis G4 series.

## 4. Speaker-Ceiling Mount-8in

- a. Provide 8" ceiling mounted speakers at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Speaker baffles shall be round or square steel with white finish as required. Provide square surface mount boxes with matching finish where required. Speakers shall provide 1/2W, 1W, 2W, and 4W power taps for use with 25V or 70V systems. At the 4 watt setting, the speaker shall provide a 94 dBA sound output a frequency of 1000 Hz. when measured in an anechoic chamber at 10 ft.
- b. Basis of Design: EST Integrity series.

## 5. Multi-purpose Loudspeakers

- a. Provide multipurpose loudspeakers at the locations shown on the drawings. Loudspeakers will be high-efficiency double re-entrant type and shall deliver 15 watts of continuous power. Loudspeaker shall be UL 1480 listed as a fire protective signaling speaker. Speaker shall

- be constructed of epoxy-coated metal and ABS plastic components. Speaker shall be furnished with a red finish.
- b. Basis of Design: Edwards Signaling #5552 series.
- 6. Low Profile Speaker-Strobe
  - a. Provide low profile wall mount speaker/strobes at the locations shown on the drawings. The low profile speaker/strobe shall not extend more than 1" (2.5cm) past the finished wall surface, and provide a switch selectable audible output of 2W (90dBA), 1W (87dBA), 1/2W (84dBA), or 1/4W (81dBA) at 10 ft. when measured in reverberation room per UL-464.
  - b. Strobes shall provide synchronized flash output, that shall be switch selectable for output values of 15cd, 30cd, 75cd & 110cd. Wattage and candela settings shall be visible with the cover installed. When the cover is installed, no mounting hardware shall be visible. In and out screw terminals shall be provided for all wiring. The low profile speaker/strobes shall mount in a 4" x 2 1/8" square electrical box, without trims or extension rings.
  - c. Provide factory manufactured boxes for all surface mounted applications.
  - d. Basis of Design: EST Genesis G4 series.
- 7. Speaker-Strobe Ceiling Mount-8in
  - a. Provide 8" ceiling mounted speaker/strobes at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Speaker baffles shall be round or square, steel with white finish as required. Provide square surface mount boxes with matching white finish as required. Speakers shall provide 1/2w, 1w, 2w, and 4W power taps for use with 25V or 70V systems. At the 4 watt setting, the speaker shall provide a 94 dBA sound output a frequency of 1000 Hz. when measured in an anechoic chamber at 10 ft. Strobes shall provide synchronized flash outputs. Strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 75cd, and 110cd devices.
  - b. Basis of Design: EST Integrity series.
- 8. Low Profile Strobes
  - a. Provide low profile wall mounted strobes at the locations shown on the drawings. In and out screw terminals shall be provided for wiring. Strobes shall provide synchronized flash outputs. Strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd, or 110cd devices. Low profile strobes shall mount in a single gang box.
  - b. Provide factory manufactured boxes for all surface mounted applications.
  - c. Basis of Design: EST Genesis series.

## 2.4 INITIATION AND CONTROL MODULES

### A. General

- 1. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Modules requiring EPROM, PROM, ROM changes or DIP switch and/or jumper changes shall not be acceptable. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes which can be retrieved for troubleshooting assistance. Input and output circuit wiring shall be supervised for open and ground faults. The module shall be suitable for operation in the following environment:
  - a. Temperature: 32oF to 120oF (0oC to 49oC)
  - b. Humidity: 0-93% RH, non-condensing

### B. Control Relay Module

- 1. Provide intelligent control relay modules at the locations shown on the drawings. The Control Relay Module shall provide one form "C" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and

releasing systems. The position of the relay contact shall be confirmed by the system firmware. The control relay module shall be suitable for mounting on 2 ½" (64mm) deep single gang boxes or 1 ½" (38mm) deep 4" square boxes with single gang covers.

2. Basis of Design: EST model SIGA-CR.
- C. Dual Input Module
1. Provide intelligent dual input modules at the locations shown on the drawings.. The Dual Input Module shall provide two (2) supervised Class B input circuits each capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on 2 ½" (64mm) deep single gang boxes or 1 ½" (38mm) deep 4" square boxes with single gang covers. The dual input module shall support the following circuit types:
    - a. Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
    - b. Normally-Open Alarm Delayed Latching (Waterflow Switches)
    - c. Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
    - d. Normally-Open Active Latching (Supervisory, Tamper Switches)
  2. Basis of Design: EST model SIGA-CT2.
- D. Dual Input Signal Module
1. Provide intelligent dual input signal modules at the locations shown on the drawings. The Dual Input (Dual Riser Select) Signal Module shall provide a means to selectively connect one of two (2) signaling circuit power risers to one (1) supervised output circuit. The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers. The dual input signal module shall support the following operation:
  2. Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A, 25 Vrms @ 50w or 70 Vrms @ 35w of Audio).
  3. Basis of Design: EST model SIGA-CC2.
- E. Isolator Module
1. Provide intelligent fault isolators modules at the locations shown on the drawings. The Isolator Module shall be capable of isolating and removing a fault from a class A data circuit while allowing the remaining data loop to continue operating. The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers.
  2. Basis of Design: EST model SIGA-IM.
- F. Monitor Module
1. Provide intelligent monitor modules at the locations shown on the drawings. The Monitor Module shall be factory set to support one (1) supervised Class B Normally-Open Active Non-Latching Monitor circuit. The monitor module shall be suitable for mounting on 2 ½" (64mm) deep 1-gang boxes or 1 ½" (38mm) deep 4" square boxes with 1-gang covers.
  2. Basis of Design: EST model SIGA-MM1.
- G. Single Input Module
1. Provide intelligent single input modules at the locations shown on the drawings. The Single Input Module shall provide one (1) supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on 2 ½" (64mm) deep 1-gang boxes or 1 ½" (38mm) deep 4" square boxes with 1-gang covers. The single input module shall support the following circuit types:
    - a. Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
    - b. Normally-Open Alarm Delayed Latching (Waterflow Switches)
    - c. Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
    - d. Normally-Open Active Latching (Supervisory, Tamper Switches)
  2. Basis of Design: EST model SIGA-CT1.
- H. Single Input Signal Module
1. Provide intelligent single input signal modules at the locations shown on the drawings. The Single Input (Single Riser Select) Signal Module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. When selected as a

telephone power selector, the module shall be capable of generating its own "ring tone". The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers. The single input signal module shall support the following operations:

- a. Audible/Visible Signal Power Selector (Polarized 24 Vdc @ 2A, 25Vrms @50w or 70 Vrms @ 35 Watts of Audio)
  2. Basis of Design: EST model SIGA-CC1.
- I. Suppression System Releasing Module
1. Provide addressable suppression system releasing interface modules at the locations shown on the drawings. The interface shall be suitable for preaction and deluge sprinkler systems and clean extinguishing agent release. The interface shall provide supervised Class B circuits required for solenoid activation, manual release, system abort, and audible and visible notification of pending release. The interface shall provide all required release and abort timing functions. The interface shall be listed for use with solenoid releasing valves that has both ULI listing and FM approval. The solenoid release circuit shall be provided with a manual disconnect switch for system maintenance.
  2. Basis of Design: EST model SIGA-REL.
- J. Universal Class AB Module
1. Provide intelligent class A/B modules at the locations shown on the drawings. The Universal Class A/B Module shall be capable of a minimum of fifteen (15) distinct operations. The module shall be suitable for mounting on 2 ½" (64mm) deep 2-gang boxes or 1 ½" (38mm) deep 4" square boxes with 2-gang covers. The universal class A/B module shall support the following circuit types:
    - a. Two (2) supervised Class B Normally-Open Alarm Latching.
    - b. Two (2) supervised Class B Normally-Open Alarm Delayed Latching.
    - c. Two (2) supervised Class B Normally-Open Active Non-Latching.
    - d. Two (2) supervised Class B Normally-Open Active Latching.
    - e. One (1) form "C" dry relay contact rated at 2 amps @ 24 Vdc.
    - f. One (1) supervised Class A Normally-Open Alarm Latching.
    - g. One (1) supervised Class A Normally-Open Alarm Delayed Latching.
    - h. One (1) supervised Class A Normally-Open Active Non-Latching.
    - i. One (1) supervised Class A Normally-Open Active Latching.
    - j. One (1) supervised Class A 2-wire Smoke Alarm Non-Verified.
    - k. One (1) supervised Class B 2-wire Smoke Alarm Non-Verified.
    - l. One (1) supervised Class A 2-wire Smoke Alarm Verified
    - m. One (1) supervised Class B 2-wire Smoke Alarm Verified
    - n. One (1) supervised Class A Signal Circuit, 24Vdc @ 2A.
    - o. One (1) supervised Class B Signal Circuit, 24Vdc @ 2A.
  2. Basis of Design: EST model SIGA-UM.
- K. Waterflow-Tamper Module
1. Provide intelligent waterflow/tamper modules at the locations shown on the drawings. The Waterflow/Tamper Module shall be factory set to support two (2) supervised Class B input circuits. Channel A shall support a Normally-Open Alarm Delayed Latching Waterflow Switch circuit. Channel B shall support a Normally-Open Active Latching Tamper Switch. The waterflow/tamper module shall be suitable for mounting on 2 ½" (64mm) deep 1-gang boxes or 1 ½" (38mm) deep 4" square boxes with 1-gang covers.
  2. Basis of Design: EST Model SIGA-CT2.

## 2.5 CONDUCTORS

- A. The requirement of this section apply to all system conductors, including all signaling line, initiating device, notification appliance, auxiliary function, remote signaling, AC and DC power and



grounding/shield drain circuits, and any other wiring installed by the Contractor pursuant to the requirements of these Specifications.

- B. All circuits shall be rated power limited in accordance with NEC Article 760.
- C. All new system conductors shall be of the type(s) specified herein.
1. All initiating circuit, signaling line circuit, AC power conductors, shield drain conductors and grounding conductors, shall be solid copper, stranded or bunch tinned (bonded) stranded copper.
  2. All signaling line circuits, including all addressable initiating device circuits shall be 18 AWG minimum multi-conductor jacketed twisted cable or twisted shielded or as per manufacturer's requirements.
  3. All non-addressable initiating device circuits, 24 VDC auxiliary function circuits shall be 18 AWG minimum or per manufacturer's requirements.
  4. All notification appliance circuit conductors shall be solid copper or bunch tinned (bonded) stranded copper. Where stranded conductors are utilized, a maximum of 19 strands shall be permitted for #12/AWG and larger conductors. Minimum size conductor shall be #12 AWG.
  5. All audible notification appliance circuits shall be 14 AWG minimum twisted pairs or twisted pairs shielded or per manufacturer's requirements.
  6. All visual notification appliance circuits shall be #12 AWG minimum THHN or twisted pairs or twisted shielded pairs or per manufacturer's requirements.
  7. Color code fire alarm conductors as follows:

<u>ITEM</u>	<u>COLOR</u>
Initiating Device	Orange/Brown
Horn (Exterior)	Blue and Yellow
Flashing Lights	Blue and Yellow
Control Panel Power	Black, White and Green
Air Handler Shutdown	Purple
Door Holders	White

8. All conductors shall be terminated with crimp type, open end, space lugs using tool approved by lug manufacturer. Terminal cabinets shall be provided with screw type terminal strips and plywood backboards.

## 2.6 CONDUCTORS AND RACEWAY

- A. Except as otherwise required by Code and/or these Specifications, the installation of all system circuits shall conform to the requirements of Article 760 and raceway installation to the applicable sections of NFPA 70, National Electrical Code. Fire alarm circuit wiring shall include all circuits described in Section 760.1 including Fine Print Note No. 1 (FPN No. 1), and as defined by the manufacturer's UL listing..
- B. The entire system shall be installed in a skillful manner in accordance with approved manufacturer's installation manuals, shop drawings and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation. All wiring shall be of the type required by the NEC and approved by local authorities having jurisdiction for the purpose.
- C. Any shorts, opens, or grounds found on new or existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.
- D. The contractor shall neatly tie-wrap all field-wiring conductors in the gutter spaces of the control panels and secure the wiring away from all circuit boards and control equipment components. All field-wiring circuits shall be neatly and legibly labeled in the control panel. No wiring except home runs from life safety system circuits and system power supply circuits shall be permitted in the control panel enclosures. No wiring splices shall be permitted in a control panel enclosure.

- E. All penetration of floor slabs and firewalls shall be fire stopped in accordance with all local fire codes.

## 2.7 OPEN CABLE

- A. Power-limited cable in accordance with NEC Article 760, where used, not installed in UL listed metal conduit or raceway shall be mechanically protected by building construction features:
- B. Installation shall be in areas not subjected to mechanical injury.
- C. All circuits shall be supported by the building structure. Cable shall be attached by straps to the building structure at intervals not greater than 10 feet. Wiring installed above drop ceilings, cable shall not be laid on ceiling tiles. Cable shall not be fastened in a manner that puts tension on the cable.
- D. Cable type shall be FPLP, FPLR or FPL, or permitted substitutions, selected for the installation application as required by NEC 70, Section 760-61.
- E. All cable that is not enclosed by conduit shall be supported and anchored with nylon straps or clamps. The use of staples is prohibited.

## 2.8 CONDUIT RACEWAY

- A. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
- B. The requirements of this section apply to all system conduits, raceways, electrical enclosures, junction boxes, pull boxes and device back boxes.
- C. All system conduits shall be of the sizes and types specified.
- D. All system conduits shall be EMT, 3/4 -inch minimum, except for flexible metallic conduit used for whips to devices only, maximum length 6 feet, 3/4-inch diameter, minimum.
- E. All system conduits, which are installed in areas, which may be subject to physical damage or weather, shall be IMC or rigid steel, 3/4 -inch minimum.
- F. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.
- G. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or by fire damage, and so as not to interfere with existing building systems, facilities or equipment, and to facilitate service and minimize maintenance.
- H. All conduits, except flexible conduit whips to devices, shall be solidly attached to building structural members, ceiling slabs or permanent walls. Conduits shall not be attached to existing conduit, duct work, cable trays, other ceiling equipment, drop ceiling hangers/grids or partition walls, except where necessary to connect to initiating, notification, or auxiliary function devices.
- I. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back boxes shall be readily accessible for inspection, testing, service, and maintenance.

## 2.9 FIREFIGHTER'S IN-BUILDING RADIO COMMUNICATIONS SYSTEM

### A. General

1. Provide an in-building radio communications system throughout the building to provide complete fire department coverage in the building.
2. Early completion of the firefighter's radio communications system will be required so as to permit a certificate of occupancy to be obtained in a timely manner, in accordance with a schedule established by the A/E.
3. The entire system shall meet with the approval of the Fire Department, the USPS, and all other agencies and authorities having jurisdiction.
4. The work of this section shall include the responsibility for all filings with the USPS, Fire Department, and any other agencies having jurisdiction. Where filings require the engineer's signature, documents shall be submitted for his review and descriptive notes and/or specifications, wiring diagrams, shop drawings, and amendment forms, as well as, the payment of any required filing fees.
5. Permits necessary for installation of the work shall be obtained prior to the commencement of the work.
6. Include as part of the base bid quotation the cleaning and adjustment of all components of the system as needed during the warranty period and the testing of system devices to comply with Building Department and Fire Department requirements, during the warranty period.
7. In addition to the base bid price quotation, submit separate quotations for each of the "Service Contract" components described hereinafter. It shall be understood that these quotations shall be for a one (1) year period commencing with the expiration of the warranty period. The "contract" shall be renewable, at the Owner's option, for one (1) year periods up to a total of five (5) years. The renewal contracts shall be based on the original, escalated by the national C.P.I. index. The quotations shall be for the following:
  - a. Inspection and Test – Provide all materials and labor to test system by verifying operation of the system throughout the building. Adjust as required to provide optimum system performance. Parts and labor for repairs and/or replacements is excluded. Provide unit prices for all components for the system, installed in place. The service shall be provided at regular intervals complying with the requirements of the USPS and the Fire Department.
  - b. Repairs and Replacement – Provide all labor and parts as necessary to repair and/or replace any and all defective equipment components.
8. Include a minimum of (2) 4 hour training sessions, conducted by factory representatives to thoroughly familiarize Owner's maintenance and operating personnel with all system features and locations.
9. The existing building utilizes several wireless systems for communication and process control. Provide testing and make all necessary adjustments to ensure that operation of in-building radio system does not interfere with wireless systems.

### B. System Description

1. Design Requirements
  - a. The firefighter's radio system shall receive radio broadcasts from firefighter's handheld radio units and rebroadcast the signal on another frequency.
  - b. The system shall receive and transmit broadcasts on specific frequencies in the UHF "T" band as required to be compatible with local fire department equipment. Signal strength shall be as required for clear reception throughout the building utilizing the handheld radio units which are in use by the local fire department.
  - c. The system shall be complete with all components and wiring required for compliance with all applicable codes and regulations, and for its operation as described hereinafter. No exclusion from or limitation in the symbolism used on the drawings or the language used in these specifications shall be interpreted as a reason for omitting any appurtenances or accessories required to enable the system to perform the specified functions.

2. Performance Requirements
    - a. The system as installed must comply with all applicable sections of FCC Rules. (Parts 22, 90, and 101).
    - b. The downlink (from BFD) pass band of the BDA shall have a center frequency of 483.2 +/- 75 KHz. The uplink (to BFD) pass band of the BDA shall have a center frequency of 486.2 +/- 75 KHz.
    - c. All in-building radio systems shall be complete with both analog and digital communications simultaneously at the time of installation.
    - d. Permanent external filters or attachments shall not be permitted.
    - e. A donor antenna must maintain isolation from the distributed antenna system and shall be a minimum of 15 db above the signal booster gain under all operating conditions.
  3. The signal booster shall operate from 110 VAC source using internal power supplies and regulators. Provisions for optional external DC battery operation shall include a power transfer circuit, a weather tight MIL spec rated connector mounted at the bottom of the cabinet.
  4. The signal booster shall be designed to allow degraded performance in adverse conditions such as high temperatures in the event heat from a nearby fire, voltage fluctuations or other abnormal conditions that may occur during an emergency. Circuits that intentionally disable the signal booster in such situations (i.e. under/over voltage, over/under current, over/under temperature, etc.) are not acceptable. It is the purpose of this specification to assume the maximum possible level of communications to public safety personnel depending upon the signal booster, even to the extent of damaging the signal booster, as long as some communications benefit can be provided during the emergency.
  5. System design shall be such that neither the failure of the normal power sourced, the transfer to an emergency source, nor the retransfer to the normal source shall cause a change in system status.
  6. If any part of the installed system or systems contains an electrically powered component, the system shall have the capability to operate on an independent battery system for a minimum period of twelve (12) hours without external power input. The battery system shall automatically charge in the presence of an external power input. A "trouble" indicator shall be provided on the Fire Alarm panel to indicate trouble with the power source or charging source of the unit.
- C. Qualifications
1. The design is based on Comtronics Wireless Communications to establish standards of quality for materials and performance. The naming of a specific manufacturer or catalog number does not waive any requirement or performance of individual components described in the specifications.
  2. Acceptable alternate manufactures are Motorola or Ericsson.
- D. Products
1. Components shall include but not be limited to:
    - a. Bi-directional amplifiers
    - b. Plenum rated Radiax cable
    - c. Plenum rated Helix cable
    - d. Antennas
    - e. Termination boards
    - f. Cable taps
    - g. Connectors
    - h. Power dividers
    - i. Other components and interconnecting circuitry as required
  2. The amplifier and all associated filters shall be housed in a single NEMA 4 rated, painted steel weather tight enclosure, with hinged lockable doors to guard against unauthorized access or removal of components. The cabinet shall be large enough to dissipate internal heat without venting the inside of the cabinet to the outside atmosphere. External or exposed filters are unacceptable. Each unit shall have an attached engraved nameplate identifying the unit. The cabinet shall be painted fire engine red and bear the lettering as follows: "Boston Fire Dept. Radio, BDA Permit #, Serviced by: [vendor name and telephone number]" in bright yellow.

## E. Installation

1. The radio and bi-directional amplifiers shall not be located in electric closets. They shall be located in suitable non-finished spaces as approved by the Engineer and/or were specifically shown on the drawings. The radio and bi-directional amplifiers shall be provided with NEMA 1 enclosures, hinged lockable doors, electric supervision against unauthorized access and the removal of any components, and shall each have any attached engraved nameplate identifying the unit.
2. Cables other than radiating coaxial cables shall be run in conduit. Conduit shall be electric metallic or threaded conduit subject to the restrictions specified elsewhere in this section.
3. Radiating coaxial cables shall be run without conduit. Where installed in a plenum type ceiling cable, insulation shall be of a fire-resistant low-smoke producing type, UL classified as plenum cable. This classification shall be clearly marked on the outer surface of the cable at regular intervals.
4. Components indicated on the drawings shall be located where shown. Components which are required for proper operation, but which are not indicated on the drawings shall be located in mechanical rooms, at accessible locations within suspended ceilings or at locations for which express permission of the A/E has been obtained.

## F. Testing

1. Upon completion of the installation (and as directed by the A/E) the work shall include making all arrangements and providing any assistance necessary for inspection and test as required for approval by the Fire Department. Modifications, adjustments and/or corrective work necessary to obtain approval along with subsequent inspection and test resulting from the issuance of a "Notice of Defect" shall precede any consideration of formal acceptance by the A/E. In conjunction with the above, training as deemed necessary to instruct authorized building personnel in the proper operation of the system shall also form a part of the required work.
2. Acceptance factors
  - a. Acceptance testing for an in-building radio system is required, upon completion of installation, have the radio system tested to ensure that two-way coverage on each floor of the building is a minimum of 95%. Each floor of the building shall be divided into a grid of approximately twenty (20) equal areas.
  - b. A maximum of one (1) area will be allowed to fail the test. A spot located approximately in the center of a grid area will be elected for the test. Once the spot has been selected, prospecting for a better spot within the grid area will not be permitted.
  - c. The field strength testing instruments are to be recently calibrated (1 year) and of the frequency selective type incorporating a flexible antenna similar to the ones used on the hand held transceivers.
  - d. The gain values of all amplifiers shall be measured and the results kept on file with the building owner so that the measurements can be verified each year during the annual tests. In the event that the measurement results become lost, the building owner will be required to rerun the acceptance test to re-establish the gain values.
  - e. A Certificate of Occupancy shall not be issued to any structure if the building fails to comply with this section.
  - f. A representative of the Boston Fire Department Communications Section shall oversee the acceptance test. Notify the Boston Fire Department two weeks prior to test.
3. Qualifications of Testing Personnel
  - a. All tests shall be conducted, documented, and signed by a person in possession of a current FCC license. All test records shall be retained on the inspected premises by the building owner and a copy submitted to the FIRE DEPARTMENT OFFICIALS.

## G. Fire Department Inspections

1. Fire Department Radio personnel, after providing reasonable notice tot he owner or his representative, shall have the right to enter onto the property to conduct field-testing to be certain that the require level of radio coverage is present.

- H. Property Owner Letter
  - 1. At final acceptance the applicant shall supply a letter to the Superintendent of Fire Alarm, 59 Fenway, Boston, MA 02115, accepting the property owners responsibilities. These responsibilities are as follows: upgrades to system as directed by the Boston Fire Department, maintenance contract in place with name of contractor, who will provide a 24 hour by 7 day emergency response within two (2) hours after notification, and contact personnel with phone numbers.
  - 2. This letter is to be on company letterhead signed by the property owner or a legal representative.
- I. Required Forms
  - 1. All required forms can be obtained from the Boston Fire Communications Section, 59 Fenway, Boston, MA 02115, (617) 343-2875.
    - a. Initial Acceptance Test
    - b. Annual Test
    - c. Five Year Test
- J. System Monitoring Alarm
  - 1. Each amplifier unit will have a monitoring system that monitors amplifier operation and primary power. Upon failure, a Sonalert audible warning device (90 dB minimum) will activate. Silencing of this alarm is the responsibility of the equipment maintenance contractor. The Fire Dept. is to be notified of any failures that extend past two (2) hour time limit.
  - 2. Provide interface to Fire Alarm System Monitor modules for trouble signal of all amplifiers and power supplies.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Section 017300 - Execution: Verification of existing conditions before starting work.
- B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
  - 1. Examine areas in which Work of this Section is to be performed.
  - 2. Verify that surfaces and site conditions are ready to receive Work.
- C. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the United States Postal Service.

#### 3.2 INSTALLATION

- A. General
  - 1. All equipment shall be attached to walls and ceiling/floor assemblies and shall be mounted firmly in place. Detectors shall not be supported solely by suspended ceilings. Fasteners and supports shall be sized to support the required load.
- B. Installation Sequence
  - 1. Installation of the systems shall be conducted in stages and phased such that circuits and equipment are installed in the following order:
    - a. Riser conduits, AC power conduits and control cabinets.

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- b. Control panel(s), control component(s), remote annunciator(s), and printer(s).
  - c. Conduits and wiring for complete notification circuits and appliance installation throughout facility.
  - d. Pre-test the audible and visual notification appliance circuits.
  - e. Install all new detection devices.
  - f. Terminate between field devices and the associated control equipment.
  - g. Complete the interface to all suppression and ancillary shutdown systems.
  - h. Complete contractor pre-test of system.
  - i. Complete system testing
- C. Install products in accordance with NFPA standards and manufacturer's published instructions.
  - D. Install manual station with operating handle 48 inches (1.22 m) above floor. Install audible and visual signal devices in accordance with NFPA 72 and ANSI/UL 1971.
  - E. End-of-line resistor device at the last easily accessible mount device or separate box adjacent to last device.
  - F. Flush mount outlet box for electric door holder to withstand 80 pounds pulling force.
  - G. Make wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, and all other devices.

### 3.3 PREPARATION

- A. Coordinate work of this Section with other affected work and construction schedule.

### 3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Field testing and inspection.
- B. Test in accordance with NFPA 72 and local fire department requirements. Use "Record of Completion" Figure 4.5.2.1 (NFPA 72).
- C. Manufacturer's Field Services: Provide services of NICET certified Level III technician to supervise installation, adjustments, final connections, and system testing. Submit written certification on manufacturer's letterhead to Contracting Officer that system has been installed in accordance with applicable codes and is functioning properly. Provide copy of "Certificate of Completion" and place inside plastic envelope at Fire Alarm Control Panel.
- D. Inspection:
  - 1. Inspect equipment installation, interconnection with system devices, mounting locations, and mounting methods.
  - 2. Verify that units and controls are properly installed, connected, and labeled and that interconnecting wires and terminals are identified.
- E. Pretesting: Align and adjust system and perform pretesting of components, wiring, and functions to verify conformance with specified requirements. Correct deficiencies by replacing malfunctioning or damaged items with new items. Retest until satisfactory performance and conditions are achieved.
- F. Acceptance Operational Tests:
  - 1. Perform operational system tests to verify conformance with specifications:
    - a. Each alarm initiating device installed shall be operationally tested in the presence of a contracting officer's representative. Each device shall be tested for alarm and trouble conditions. Contractor shall submit a written certification that the Fire Alarm System

installation is complete including all punch-list items. Test battery operated emergency power supply. Test emergency power supply to minimum durations specified. Test Remote Station Signal Transmitter. Coordinate testing with the Public Authority and Remote Station monitoring firm/entity. Submit written documentation from Remote Station monitoring firm/entity that Fire Alarm Signal Transmitter is operating properly.

- b. Test each Signal Appliance installed for proper operation. Submit written report indicating sound levels at specified distances.
  - c. Test Fire Alarm Control Panel(s) and Remote Annunciator(s).
  - 2. Provide minimum 10 days notice of acceptance test performance schedule to Contracting Officer, Remote Station monitoring firm/entity, and local fire authorities having jurisdiction.
  - 3. The Contractor shall provide certification that the system is installed entirely in accordance with the system manufacturer's recommendations and within the limitations of the required listings and approvals, that all system hardware and software has been visually inspected and functionally tested by a manufacturer's certified representative, and that the system is in proper working order.
- G. Retesting: Correct deficiencies and retest until total system meets the requirements of Specifications and complies with applicable standards.

### 3.5 WARRANTY AND MAINTENANCE

- A. Warranty: The contractor shall warranty all materials, installation and workmanship for 12 months from date of acceptance, unless otherwise specified. A copy of the manufacturer's warranty shall be provided with close-out documentation and included with the operation and installation manuals.
- B. Spare Parts
  - 1. The Contractor shall supply the following spare parts:
    - a. Automatic detection devices -Five (5) percent of the installed quantity of each type.
    - b. Manual fire alarm stations - Five (5) percent of the installed quantity of each type.
    - c. Glass rods or panels for break glass manual fire alarm stations (if used) – Ten percent of the installed quantity, but no less than ten (10) devices.
    - d. Audible and visible devices - Five (5) percent of the installed quantity of each type.
    - e. Keys - A minimum of four (4) sets of keys shall be provided and appropriately identified.

### 3.6 TRAINING

- A. The System Supplier shall schedule and present a minimum of 24 hours each of documented formalized instruction for the designated personnel, detailing the proper operation of the installed System.
- B. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
- C. The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.
- D. Instruction shall be made available to the Local Municipal Fire Department if requested by the Public Authority

### END OF SECTION

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